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SECTION 2200 - SECONDARY AND CUMULATIVE IMPACTS

SECTION 2210.00 - INTRODUCTION

This section deals with some of the most challenging sections of an environmental document, namely consideration of:

- Indirect or secondary impacts
- Cumulative impacts
- Irreversible and irretrievable commitment of resources
- Relationship between local short-term uses of the environment and long-term productivity

The evaluation of cumulative effects should include the identification and analysis of cumulative impacts, as well as relationship of these effects with mitigation considerations for the project's impacts. These sections require thinking into the future and outside the immediate project area, and considering a range of possible impacts beyond the most obvious.

For example, if a proposed highway is to be built near a wetland, a *direct impact* would be filling the wetland; an *indirect impact* would be increased development because of improved access; and a *cumulative impact* would be the gradual loss of wetland in the watershed due to the highway and other development.

An *irreversible commitment* of resources would be productive farmland or forest replaced by a highway. An *irretrievable commitment* of resources would be the use for highway construction of fossil fuels and minerals that are non-renewable and ultimately limited in supply.

A *local short-term use* of the environment would be improved traffic flow and access resulting from a new interchange, weighed against the *long-term productivity* of farmland, forest, estuary, wetland, or other ecosystems that would be lost.

In the past, secondary and cumulative impacts have seldom affected FHWA/ITD environmental and project location decisions because of limited guidance available to direct the assessment of those impacts. The emphasis has been on direct impacts, and efforts to improve identification and analysis of impacts have centered on areas of the most visible and immediate concern.

In recent years, the potential for secondary and cumulative impacts – particularly to aquatic resources from a watershed perspective and to air resources – has been increasingly recognized. The importance of recognizing such impacts has become an important issue that has the potential to temper ITD decisions on project scope, location, and mitigation alternatives. Improved techniques are evolving that will help ensure appropriate identification and analysis both immediate and long-term cumulative impacts, and also to help direct associated mitigation actions related to the project(s). Two important factors to consider in determining the potential for secondary and cumulative impacts are:

Potential for future development – In areas experiencing little growth, an individual highway project will likely contribute negligibly to cumulative impact because of the absence of other development activity. Conversely, in areas of moderate to rapid development, a highway improvement can add measurably to the aggregated change leading to long-term impacts.

Type of project – Capacity improvements, additional interchanges, and construction on a new location generally have greater potential for secondary effects than projects to upgrade existing facilities. New access into undeveloped locations can contribute to subsequent development activity.

2210.01 Summary of Requirements. NEPA requires consideration of cumulative as well as direct and indirect impacts, irretrievable and irreversible commitment of resources, and the relationship between local short-term uses of the environment and long term productivity. Cumulative impacts should be discussed in individual sections on each element of the environment, along with direct and indirect impacts. A summary of cumulative impacts may also be included in a separate section. Environmental documents should also include a separate discussion of the overall irretrievable and irrevocable commitment of resources, and the relationship between local short-term uses of the environment and long-term productivity.

Federal implementing regulations are at 23 CFR 771 (FHWA) and 40 CFR 1500-1508 (CEQ). For details on NEPA procedures, see [Section 200](#).

2210.02 Acronyms and Abbreviations.

CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
FAQ	Frequently Asked Questions
NEPA	National Environmental Policy Act
SCI	Secondary and cumulative Impacts

2210.03 Glossary.

Effect – See “Impact.”

Cumulative impact – Impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

Direct effect – Effect caused by the proposed action and occurring at the same time and place.

Indirect effect – Effect caused by the proposed action that is later in time or farther removed in distance, but still reasonably foreseeable. Indirect effects may include growth-inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems.

Impact – Synonymous with “Effect”. Includes ecological impacts (such as the effects on natural resources and on the components, structures, and functioning of affected ecosystems), aesthetic, historic, cultural, economic, social, or health impacts, whether direct, indirect, or cumulative. Effects may also include those resulting from actions that may have both beneficial and detrimental effects, even if on balance the agency believes the effect will be beneficial.

Irretrievable –Impossible to retrieve or recover.

Irreversible – Impossible to reverse.

Resource – Referred to in NEPA implementing regulations as “natural or depletable” resources (CEQ 1502.16) FHWA Technical Advisory T6640.8A (October 30, 1987) refers to “natural, physical, human, and fiscal resources” in guidance on irreversible and irretrievable commitments of resources.

SECTION 2220.00 - APPLICABLE STATUTES AND REGULATIONS

2220.01 National Environmental Policy Act. The National Environmental Policy Act (NEPA), 42 USC Section 4321, requires that all actions sponsored, funded, permitted, or approved by federal agencies undergo planning to ensure that environmental considerations, including direct, indirect, and cumulative impacts, are given due weight in project decision-making.

In addition to direct and observable effects, agencies are required to examine effects that may be indeterminate or not easily recognized; referred to as “secondary and cumulative impacts.”

Under NEPA an Environmental Document is also to include “the relationship between local short term uses of man’s environment and the maintenance and enhancement of long-term productivity;” and “any irreversible and irretrievable commitments of resources which would be involved in the proposed action should it be implemented.” A good overview of NEPA requirements and FHWA guidance is available on FHWA’s environmental home page:

<http://www.fhwa.dot.gov/> Click on FHWA Programs, then Environment, then NEPA, then NEPA: Project Development Process, then Transportation Decision making, then Secondary and Cumulative Impacts (under Environmental Impacts and Mitigation):
http://www.fhwa.dot.gov/environment/2nd_cml.htm

2220.2 NEPA Implementing Regulations.

2220.02.01 CEQ Rules. The 1978 regulations of the Council on Environmental Quality (CEQ) implemented the action provisions of NEPA. These regulations broadly define the direct, indirect, and cumulative effects that must be evaluated. Generally, secondary effects are induced by the action. They include a variety of effects such as changes in land use, water quality, economic vitality, and population density. Cumulative impacts are less defined and may be undetectable when viewed in the context of direct and indirect impacts, but nonetheless can add to other disturbances and eventually lead to a measurable environmental change. They require that agencies examine indirect consequences that may occur in areas beyond the immediate influence of a proposed action and at some time in the future (40 CFR 1508).

2220.02.02 FHWA Rules. FHWA implements NEPA and the CEQ guidelines with its environmental regulations (23 CFR 771). These regulations interpret the CEQ guidelines on secondary and cumulative impacts in a unique way. These impacts are referenced when justification is required for the use of categorically excluded actions. Categorical Exclusions (CE) are actions which “do not induce indirect significant impacts to planned growth or land use...” or “do not otherwise, either individually or cumulatively, have any significant impacts.

SECTION 2230.00 - POLICY GUIDANCE

2230.01.01. FHWA policy on secondary and cumulative impacts is given in a memorandum and accompanying *Position Paper on Secondary and Cumulative Impact Assessment in the Highway Development Process*, (August 20, 1992). Following are several excerpts:

“The Federal Highway Administration (FHWA) implements NEPA and the CEQ guidelines with its environmental regulations at 23 CFR 771. The regulation describes documentation requirements and procedures for environmental clearances. Concerning secondary and cumulative impacts, the FHWA regulation interprets the CEQ guidelines in a unique way. Under our regulations these impacts are referenced when justification is required for the use of categorically excluded actions. In 0771.117, Categorical Exclusions (CE) are actions which "do not induce indirect significant impacts to planned growth or land use..." or "...do not otherwise, either individually or cumulatively, have any significant impacts." Thus in 0771.117, the FHWA regulations acknowledge that these impacts exist and must be included in project decisions. Beyond this section no distinction is made between significant impacts because it is the impacts which are significant that determine the document to be used, and not whether they are direct, secondary or cumulative.”

The above section explains why cumulative and secondary impacts are addressed in CEs that have FHWA nexus. CEQ regulations for secondary and cumulative impacts deal with EAs and EISs. Continuing on in the *Position Paper*:

“The Federal Highway Administration (FHWA) and the State highway agencies recognize the growing need to include indirect impact assessments in project environmental studies. The FHWA commitment to conduct comprehensive environmental and public interest decision-making requires the collection and presentation of all information relevant to a project, including its indirect consequences and contribution to area-wide change. Additionally, commenting agencies are now recommending that secondary and cumulative impact analyses be conducted on almost all new proposals for highway improvements. The agencies are becoming particularly vocal concerning the potential for such impacts on area-wide water, wetland, and air resources....

“The FHWA Environmental Policy Statement (EPS) issued in 1990 calls for assurances to minimize future social, economic and environmental impacts. Additionally, under the recent Intermodal Surface Transportation Efficiency Act, the FHWA must now work with the State highway agencies as never before to preserve and enhance environmental resources while implementing transportation improvement programs. These commitments will require that equal weight be given to environmental issues during the project decision-making process that normally emphasizes engineering considerations.

“These mandates place new emphasis on the examination of secondary and cumulative impacts. That is, the FHWA and the State Highway Agency must produce systematic analyses of environmental, social and economic impacts of sponsored projects that include coverage of secondary and cumulative effects. Otherwise, the analyses most likely will be incomplete under the FHWA commitment to comprehensive environmental and public interest decision-making.” The policy document is available in the Environmental Guidebook, online at FHWA’s web site: <http://environment.fhwa.dot.gov/guidebook/index.asp>

2230.01.02 Logical Termini and CEs. The following information is from a memo exchange between the FHWA Western Resource Center and the Idaho FHWA Division on a specific project. The information is presented in general terms so that it may apply to all projects. Note that the conclusion is presented as an opinion of the author of the memo but the opinion is backed with citations that are relevant to the issue.

“While it is true that 771.111(f) mentions EAs and EISs specifically and not CEs, I do not think that is determinative. (It is my belief that 771.111(f) mentions EA/FONSI and EISs because those are the type of documents where we evaluate alternatives).

First, this subsection is not under the section on EAs or EIS, but is about project development generally. For example, 771.111(f) uses the language "to avoid commitments to **transportation improvements** before they are fully evaluated. . ." (emphasis added). This is about the action not the type of NEPA document. Consider this, you do a CE on one section of a larger project and it ends at a termini which by necessity dictates a future alternative with grave environmental consequences. This is the whole reason the courts have ruled that FHWA cannot segment projects and cite to this section and the CEQ regulations on connected actions [40 CFR 1508.25(a)]. Second, the distinction between CEs, EAs and EISs is about the degree of impact. FHWA has a vested interest in its funds going to projects that have value in and of themselves. The fact that the action is processed with a CE is irrelevant to this concern and policy. Third, the FHWA memorandum on logical termini, signed by Kevin Heanue and dated 11/5/93, uses the term **project** throughout it. An action processed with a CE is still a project. Fourth, in a recent FHWA case the issue of segmentation on a project processed with a CE was litigated. While the applicability of 771.111(f) was not specifically challenged, the court did implicitly find that segmentation was a legitimate issue in the case where a project was processed with a CE and the requirements of 771.111(f) applied to the project. [As a footnote the court added a fourth requirement that the project "does not irretrievably commit federal funds for closely related projects." citing to Piedmont Heights Civic Club, Inc. v. Moreland, 637 F.2d 430, 439 (5th Cir. 1981)].

For the foregoing reasons, it is my opinion that requirements of 23 CFR 771.111(f) apply to projects processed with CEs”.

SECTION 2240.00 - MOUS, MOAS, AND IAS

None identified.

SECTION 2250.00 - TECHNICAL GUIDANCE

ITD has no specific guidance on this topic. The best sources are FHWA and CEQ reference materials described below.

2250.01 FHWA Technical Advisory. FHWA Technical Advisory T6640.8A ([Exhibit 300-4](#)) gives guidelines for preparing environmental and Section 4(f) documents. The advisory suggests the type of secondary impacts that should be discussed in several environmental topics (land use, farmland, socioeconomic, and energy). These generally involve resources that can be sensitive to change induced by a transportation project, such as the social and economic structure of a community, floodplains, and area wide water quality. While it does not specifically address cumulative impacts, the advisory does include guidance for preparing sections on the relationship

between short-term uses and long-term productivity and on irreversible and irretrievable commitments of resources (see below). This document is available online on FHWA's web site: <http://www.fhwa.dot.gov/> Click on FHWA Programs, then Environment, then Environmental Guidebook, then Cumulative and Secondary Impacts.

2250.01.01 Relationship between Short-term Uses and Long-term Productivity. The Environmental Document should discuss in general terms the relationship of local short-term impacts and use of resources, and the maintenance and enhancement of long-term productivity. The discussion might recognize that alternatives other than "no action" would have similar impacts. The discussion should point out that transportation improvements are based on state and/or local comprehensive planning which considers the need for present and future traffic requirements within the context of present and future land use development. In such a situation, one might then conclude that the local short-term impacts and use of resources by the proposed action is consistent with the maintenance and enhancement of long-term productivity for the local area, state, or region.

2250.01.02 Irreversible and Irretrievable Commitments of Resources. The Environmental Document should discuss in general terms the irreversible and irretrievable commitment of resources resulting from the proposed action. This general discussion might recognize that the alternatives would require a similar commitment of natural, physical, human, and fiscal resources. An example of such discussion is given online at the site given above.

2250.02 CEQ Guidance on Cumulative Effects. An excellent resource for cumulative effects analysis is *CEQ Handbook: Considering Cumulative Effects under the National Environmental Protection Act* (January 1997). This handbook presents the results of research and consultations by CEQ concerning the consideration of cumulative effects. It introduces the complex issue of cumulative effects, outlines general principles, presents useful steps, and provides information on methods of cumulative effects analysis.

The handbook includes the following 11-step process for analyzing cumulative impacts.

Scoping

- Step 1. Identify the significant cumulative effects issues associated with the proposed action and define the assessment goals.
- Step 2. Establish the geographic scope for the analysis.
- Step 3. Establish the time frame for the analysis.
- Step 4. Identify other actions affecting the resource.

Describing the Affected Environment

- Step 5. Characterize the resources, ecosystems, and human communities identified during scoping in terms of their response to change and capacity to withstand stress.
- Step 6. Characterize the stresses affecting these resources, ecosystems, and human communities and their relation to regulatory thresholds.
- Step 7. Develop a baseline condition for the resources, ecosystems, and human communities.

Determining Environmental Consequences

- Step 8. Identify the important cause-and-effect relationships between human activities and resources, ecosystems, and human communities.
- Step 9. Determine the magnitude and significance of cumulative effects.

Step 10. Modify or add alternatives to avoid, minimize, or mitigate significant cumulative effects.

Step 11. Monitor and evaluate the cumulative effects of the selected alternative and adapt management.

The handbook does not establish new requirements for such analyses. It should not be viewed as formal CEQ guidance on this matter, nor are its recommendations intended to be legally binding. Review the handbook at <http://environment.fhwa.dot.gov/guidebook/index.asp>

SECTION 2260.00 - FAQs

At what point do resource agencies become involved in Secondary and Cumulative Impacts ()?

Resource agencies become involved in the SCI as early as the interagency field review held early in the Stage I Project Planning Process (during preliminary alternatives development).

Why is air quality not considered the purposes of SCI?

Regional air quality is considered in the Transportation Conformity Process. This is essentially a 'cumulative' effects analysis. The 1990 Clean Air (CAA) Amendments and the 1992 Intermodal Surface Transportation Improvement Efficiency Act (ISTEA) require regional scale air quality to be assessed in a metropolitan region's Transportation Improvement Plan (TIP).

Why is noise quality not considered for the purposes of SCI?

Noise quality is not considered a resource, but is an effect resulting from traffic volumes. Traffic noise impacts a resource (generally communities). Communities may be considered a SCI resource. Readily available data regarding noise affects to communities over time can be used in the SCI as a cumulative impact.

Should communities be considered for the purposes of SCI?

Communities may be considered a resource for the purposes of SCI. Factors that affect a community's social/economic stability and quality of life (i.e., noise, visual impacts, displacements, isolation, etc.) can all be considered when assessing impacts to communities

Why is land use not considered for the purposes of SCI?

Land use is not considered a resource for the purposes of SCI. The term "land use" is a designation of how certain areas are proposed for use (i.e., residential or industrial development, open space, etc.).

How do Adequate Public Facilities Ordinances affect the development of the SCI boundary?

Adequate Public Facilities Ordinances (APFOs) should be considered when developing your SCI conclusions. The existence of APFOs within your SCI geographical boundary should be an indicator not to overstate future growth if the local roadway network is unable to support it.

Is it acceptable to use different portions of different sub-boundaries to develop the overall SCI boundary?

It is appropriate to use different portions of different sub-boundaries to develop the overall SCI geographical boundary. This is necessary because not all of the sub-boundaries used in developing the SCI geographical boundary are likely to coincide with each other. Justifications or reasons for using various portions of sub-boundaries must be documented.

Is substituting a sub-watershed for the larger watershed boundary acceptable in developing the SCI geographical boundary?

As long as the SCI geographical boundary is partially defined by resources it does not matter whether a watershed, sub-watershed or another resource boundary is used.

Can there be more than one SCI geographical boundary for different alternatives?

No, only one SCI geographical boundary is to be developed for the entire study. The various sub-boundaries being considered must be synthesized into one overall SCI geographical boundary

What percent of traffic needs to occur when determining a project's area of traffic influence?

Current Guidelines do not specify a threshold in terms of percent change in traffic volume determining a project's "area of traffic influence". The "area of traffic influence" (and the threshold percentage) for each SCI needs to be developed and the rationale documented independently for each project.

Can resources be analyzed to the external limits of a resource sub-boundary, (i.e., watershed), even if that sub-boundary falls outside of the overall SCI geographical boundary?

It is appropriate to analyze a resource to a logical sub-boundary, such as a watershed, even if it does not correspond exactly to the overall SCI boundary. These differences in boundaries, as well as how the differences may affect conclusions drawn about resource impacts, should be explained in the environmental document.

Can broad published trends that date back before the SCI past timeframe be considered?

Data that helps support conclusions about resources in the SCI geographical boundary can be used in the analysis even if it falls outside of the established SCI time frame.

What happens when a resource agency differs with ITD's proposal on how a project alternative will impact land use?

ITD develops its proposed land use scenarios primarily based on local government master plans and assumptions used in the MPO/ITD travel forecasting models. If a resource agency disagrees with a proposed scenario, then ITD and the agency will begin the conflict resolution process. The local planner(s) will also be asked to be involved to discuss the effectiveness of the local jurisdiction's land use planning and zoning process, past history, political climate, etc.

In addition to future land use information provided by local governments, MPOs and ITD travel forecasters, are there other data sources that can be used to develop future land use projects?

Although the future land use scenario is primarily developed from the local government's master plans and travel forecasters, other sources can be used to verify future land use assumptions or fill in information gaps.

How is the resource agency permitting process affected by disclosing a range of impacts to resources in the analysis section of the SCI?

Disclosing a range of impacts from proposed development that may occur to resources protected by a permitting agency provides an estimate of impacts that may occur within a SCI Geographical Boundary. This range alerts agencies to potential impacts by others. The agency then has the option to coordinate with the "others" regarding avoidance, minimization and mitigation.

When assessing impacts to resources, how can conclusions be made about these impacts without knowing the exact acreage that will be physically impacted by a change in land use?

Conclusions will be a "judgment call" based on the impact information available. If trends analyses are used, then the impact information will likely be qualitative only. For overlay analyses, the impacts can often be described quantitatively, but it's not realistic to expect an exact calculation. There are too many unknown factors, particularly the exact location of future disturbance within a parcel slated for future development. Therefore, a range of impacts to "potentially threatened" resources would be a reasonable approach.

What role does "Smart Growth" play in the SCI process?

Priority funding areas are growth boundaries established by local governments. These boundaries may possibly be an indicator of where planned growth is expected to occur within your SCI Geographical Boundary. The PFA boundaries should therefore be examined to see if they fall within the overall SCI geographical boundary just as you would consider sewer and water service, extent of project alternatives and other local planning or resource protection boundaries.

Is the No-Build scenario included in a SCI?

The No-Build Alternative should be considered only as a "baseline" for comparison to the build alternatives. Because the No-Build alternative would have no direct impacts and no secondary impacts, per the SCI Guidelines no further analysis would be warranted.

SECTION 2270.00 - NON-ROAD PROJECT REQUIREMENTS

Rail, aviation, and non-motorized transport systems are generally subject to the same policies and procedures that apply to road projects.

Exhibit 2200-1 FHWA Division Comments On Secondary and Cumulative Impacts

The following comments are excerpts from correspondence between the division and an ITD district discussing a specific project but what is included below is general guidance for all projects.

1. The development of logical project termini needs to consider a "whole" or integrated project, providing rational end points for both the transportation improvement and review of the environmental impacts. It covers a broader geographic area than the strict limits of the transportation improvements as described in the environmental document. While it is true that 771.111(f) mentions EAs and EISs specifically and not CEs, our FHWA HQ Legal Section advised it is not determinative and that the requirements of 23 CFR 771.111(f) apply to projects processed with CEs.

While there are many factors that must be considered in determining logical termini ...it is most appropriate to use the points of major traffic generation, not where the proposed improvements tie into the existing pavement

2. Secondary and cumulative impacts need to be considered in all classes of environmental actions. As discussed in 23 CFR 771.117, Categorical Exclusions by definition do not otherwise either individually or cumulatively have any significant environmental impacts; however, an evaluation still must be prepared to validate this statement and assure the environmental classification is correct. There may be impacts associated with a project that may not be significant, but need to be identified and may require mitigation. This document only needs to address Secondary Impacts (growth inducement), and the best way is to discuss any planned growth that is documented on land use plans or master plans that would occur with or without the FHWA project.

Exhibit 2200-2 CONSIDERATION OF CUMULATIVE IMPACTS IN EPA REVIEW OF NEPA DOCUMENTS

From May 1999 memo that can be found on EPA website at:
<http://www.epa.gov/compliance/resources/policies/nepa/>

1. INTRODUCTION

The combined, incremental effects of human activity, referred to as cumulative impacts, pose a serious threat to the environment. While they may be insignificant by themselves, cumulative impacts accumulate over time, from one or more sources and can result in the degradation of important resources. Because federal projects cause or are affected by cumulative impacts, this type of impact must be assessed in documents prepared under the National Environmental Policy Act (NEPA). The purpose of this guidance is to assist EPA reviewers of NEPA documents in providing accurate, realistic, and consistent comments on the assessment of cumulative impacts. The guidance focuses on specific issues that are critical in EPA's review of NEPA documents under Section 309 of the Clean Air Act. While there is no "cookbook" method of assessing cumulative impacts, the guidance offers information on what issues to look for in the analysis, what practical considerations should be kept in mind when reviewing the analysis, and what should be said in EPA comments concerning the adequacy of the analysis.

The assessment of cumulative impacts in NEPA documents is required by Council on Environmental Quality (CEQ) regulations (CEQ, 1987). Cumulative impacts, however, are not often fully addressed in NEPA documents due to the difficulty in understanding the complexities of these impacts, a lack of available information on their consequences, and the desire to limit the scope of environmental analysis. To improve how cumulative impacts are assessed in environmental impact analysis, CEQ developed a handbook entitled "Considering Cumulative Effects under the National Environmental Policy Act" (CEQ 1997). CEQ's handbook offers the most comprehensive and useful information to date on practical methods for addressing cumulative effects in NEPA documents. Consequently, the concepts presented in the handbook serve as the foundation for this guidance. Reviewers are urged to use this guidance and the CEQ handbook simultaneously.

The guidance has four sections including this introduction. Section 2 *What are Cumulative Impacts* briefly summarizes the definition and basic concepts used in this guidance. Section 3 *EPA's Review of Cumulative Impacts* addresses several fundamental questions concerning EPA's review of cumulative effects in a NEPA analysis. Section 4 *Major Review Areas* discusses several of the key areas that should be considered to adequately analyze cumulative impacts and offers practical suggestions on how to prepare comments to address cumulative impacts in NEPA documents. References are cited in a bibliography.

2. WHAT ARE CUMULATIVE IMPACTS?

Cumulative impacts result when the effects of an action are added to or interact with other effects in a particular place and within a particular time. It is the combination of these effects, and any resulting environmental degradation, that should be the focus of cumulative impact analysis. While impacts can be differentiated by direct, indirect, and cumulative, the concept of cumulative impacts takes into account all disturbances since cumulative impacts result in the compounding of the effects of all actions over time. Thus the cumulative impacts of an action can be viewed as the total effects on a resource, ecosystem, or human community of that action and all other activities affecting that resource no matter what entity (federal, non-federal, or private) is taking the actions. Consistent with the CEQ regulations (CEQ, 1987), effects and impacts are used synonymously in the guidance.

CEQ's regulations (CEQ, 1987) explicitly state that cumulative impacts must be evaluated along with the direct effects and indirect effects of each alternative. By mandating the consideration of cumulative impacts, the regulations ensure that the range of actions that is considered in NEPA documents includes not only the project proposal but also all actions that could contribute to cumulative impacts. Federal agencies prepare cumulative impact analysis using different terms and approaches. To avoid arguing over semantic differences, EPA reviewers should avoid conflicts over terminology and pursue a common sense approach. The concept of cumulative impacts as total impacts provided above is meant to facilitate discussion in this document, but it is not intended to replace other usages that meet the intent of good cumulative effects analysis.

3. EPA'S REVIEW OF CUMULATIVE IMPACTS

This section addresses fundamental questions concerning EPA's review of cumulative impact analysis in NEPA documents.

Q. How should EPA review cumulative impacts analyses in NEPA documents?

A. The assessment of cumulative impacts is not substantially different from the assessment of direct or indirect impacts. The same type of consideration is made to determine the environmental consequences of the alternatives for direct, indirect, or cumulative impacts. One possible difference is that cumulative impact assessment entails a more extensive and broader review of possible effects. Reviewers should recognize that while no "cookbook" approach to cumulative impacts analysis exists, a general approach is described in the CEQ handbook. As with the review of direct or indirect impacts, EPA review of cumulative impacts analysis is most effective if done early in the process, especially in the scoping phase.

Federal agencies have the responsibility of determining how and the extent to which cumulative impacts are assessed in NEPA documents and documenting that effort. In reviewing the analysis, the EPA reviewer should determine if the information presented is commensurate with the impacts of the project, i.e., a greater degree of detail is needed

for more potentially serious impacts. In addition, in making its rating determinations, EPA will consider cumulative impacts when determining the environmental impact of the action and the adequacy of the analysis. EPA comments should identify significant cumulative impacts that may affect resources of concern and suggest mitigation measures that will avoid or minimize adverse effects to the environment. While this guidance emphasizes the effects of projects on ecological resources, other resources and areas that should be considered include socioeconomic resources, human health, recreation, quality of life issues, and cultural and historical resources.

Q. Should EPA reviewers expect that cumulative impact analysis be done in all NEPA documents?

A. NEPA documents do not necessarily require cumulative impact assessments in every case. However, EPA expects that the action agency consider whether cumulative impacts are a significant issue that should be addressed every time a NEPA document is prepared. NEPA documents in this context include both environmental assessments and environmental impact statements. As with most NEPA assessments, the analysis should be commensurate with the project's impacts and the resources affected. In all phases of the cumulative impact assessment, EPA should ensure that the level of analysis and scope are commensurate with the potential impacts, resources affected, project scale, and other factors. While projects that have long-lasting and widespread effects in environmentally sensitive areas should receive close scrutiny, some projects may not require in-depth consideration of cumulative impacts. For example, small scale projects that have minimal impacts that are of short-duration would not likely contribute significantly to cumulative impacts.

Q. Can cumulative impacts be the basis for adverse ratings?

A. Cumulative impacts that result in significant impacts can be the basis for adverse ratings. EPA will consider cumulative impacts when determining the rating for the environmental impacts of the proposed project. Ratings should be based on the overall environmental impact of the proposed project or action, which includes cumulative impacts. When the NEPA document does not contain sufficient information, the determination of potential, total project impacts may be based on other documents, information, or on-site surveys. In these situations, the reviewer should identify the source of information that is the basis for EPA comments including those related to cumulative impact analysis.

Q. Should EPA comments suggest mitigation measures to address cumulative impacts?

A. The EPA's manual on reviewing and commenting on federal actions under NEPA and section 309 of the Clean Air Act (EPA, 1984) states that EPA's comments should include mitigation measures "...to avoid or minimize damage to the environment, or to protect, restore, and enhance the environment". It is appropriate for EPA comments to include recommendations for mitigation that address the cumulative impacts of the project. The comments should suggest a range of mitigation that addresses differing sources of the

cumulative impacts. At a minimum, the mitigation should address the proposed project's contribution to the cumulative impacts. In addition, it is appropriate to suggest mitigation to address cumulative impacts that are caused by activities other than the proposed project. For example, mitigation could include forming partnerships among the different governmental agencies and private organizations to work on environmental restoration when those entities have contributed to cumulative impacts over a long period of time. It is important to note that EPA suggestions for mitigation are not necessarily constrained by whether the action agency has jurisdiction to implement the measures but the measures should be realistic and technically feasible.

Q. Do EPA reviewers have to prove that cumulative impacts are occurring if the issue of cumulative impacts is raised by a proposed project?

A. Ultimately, the action agency is responsible for determining whether cumulative impacts will occur. However, EPA reviewers should provide enough information in their comments to show the likelihood that cumulative impacts will occur. In order to make the case that the NEPA documents should include cumulative impact analysis, EPA comments need only to show the potential for cumulative impacts to occur, not absolute proof that such impacts will take place. EPA reviewers should use existing data to support an argument for considering cumulative impacts in the document.

4. MAJOR REVIEW AREAS

Several key areas of information should be considered by EPA reviewers in determining whether the cumulative impacts assessment in a NEPA document is adequate. These areas, as described below, expand on the approach presented in the CEQ handbook. Each subsection presents background information on one of five areas and offers guidance on what EPA reviewers should look for in the assessment of cumulative impacts.

4.1 Resources and Ecosystem Components

EPA Review Approach

In reviewing cumulative impacts analysis, EPA reviewers should focus on the specific resources and ecological components that can be affected by the incremental effects of the proposed action and other actions in the same geographic area. EPA reviewers should determine whether the NEPA analysis has identified the resources and ecosystem components cumulatively impacted by the proposed action and other actions. The reviewer can determine which resources are cumulatively affected by considering:

- (1) Whether the resource is especially vulnerable to incremental effects;
- (2) Whether the proposed action is one of several similar actions in the same geographic area;
- (3) Whether other activities in the area have similar effects on the resource;

- (4) Whether these effects have been historically significant for this resource; and
- (5) Whether other analyses in the area have identified a cumulative effects concern.

Three documents that can provide useful information when considering important resource components include the 1993 EPA report, "Habitat Evaluation: Issues in Environmental Analysis Review", the 1993 CEQ report, "Incorporating Biodiversity Considerations Into Environmental Impact Analysis Under the National Environmental Policy Act", and the 1994 EPA report "Evaluation of Ecological Impacts from Highway Development".

Cumulative impacts can affect a broad array of resources and ecosystem components. In addition to considering the biological resources that are the staple of NEPA analysis, examples of other resources that should be considered include historic and archaeological sites, socioeconomic services and issues, and community structure and character. While a broad consideration of resources is necessary for the adequate assessment of cumulative impacts, the analysis should be expanded for only those resources that are significantly affected. In similar fashion, ecosystem components should be considered when they are significantly affected by cumulative impacts. The measure of cumulative effects is any change to the function of these ecosystem components.

Discussion

NEPA documents generally consider only a limited number of resources that may be potentially affected by cumulative impacts. In addition, assessments of impacts to biological resources generally have been limited to selected game species, federally or state listed threatened and endangered species, and wetlands habitats. These approaches are too limited and should be expanded to consider other valuable resources which could be affected, while also considering a broader array of potential effects.

As an example, federal assessment and mitigation for the loss of wetlands often focus primarily on the acreage affected rather than the function of the wetland within the broader ecosystem. In such a case, the impact to the wetland might not be deemed significant if the wetland had no immediate wildlife values or other notable characteristics. However, by expanding the assessment to consider the full array of wetland functions and their importance with a broader context, cumulative impacts could be more fully assessed. For example, important functions to focus on could include the wetlands' role as a nursery for recreationally and/or commercially valuable aquatic species; its ability to minimize downstream flooding; and its ability to improve water quality.

To ensure the inclusion of the resources that may be most susceptible, cumulative impacts can be anticipated by considering where cumulative effects are likely to occur and what actions would most likely produce cumulative effects. A framework for this consideration for forested areas is modified from Bedford and Preston (1988). Certain

types of forests are more likely to be affected by cumulative effects as described by the following examples:

- 1) Forests downwind from major sources of air pollution that contain plant organisms that are susceptible to ozone and other airborne pollutants;
- 2) Forested areas lower in a watershed because they are often closer to development and pollutants follow the movement of water;
- 3) Forests that are susceptible to fragmentation because, with increasing fragmentation, areas will have a large perimeter in relation to their area; and
- 4) Areas experiencing development pressure.

Resources of concern may also be identified by considering actions that alter ecological processes and therefore can be expected to produce cumulative effects. Changing hydrologic patterns, for example, is likely to elicit cumulative effects. Bedford and Preston (1988) offered the following alterations that would likely initiate cumulative effects in wetlands or watersheds:

- 1) Changes in sediment transport;
- 2) Alteration of discharge and retention rates of water;
- 3) Changes in velocity of water moving through the system;
- 4) Disposal of organic pollutants where uptake is controlled by biological processes;
- 5) Disposal of chemicals that easily separate from sediment and other materials to which they are attached; and
- 6) Filling of wetlands that result in increased pollutant loadings.

The NEPA document should identify which resources or ecosystem components of concern might be affected by the proposed action or its alternatives within the project area. Once these resources have been identified, consideration should be given to the ecological requirements needed to sustain the resources. It is important that the NEPA document consider these broader ecological requirements when assessing how the project and other actions may cumulatively affect the resources of concern. Often these ecological requirements may extend beyond the boundaries of the project area, but reasonable limits should be made to the scope of the analysis.

NEPA Example: Several examples exist of agency NEPA documents that have included a thorough consideration of resources. The Supplemental Information Report for the Trail Creek Timber Sale, Wisdom Ranger District, Beaverhead National Forest, MT was prepared by the Forest Service (Forest Service, 1991) to consider two important

resources (ecosystem components) that were not included in the FEIS for the project. The two resources were (1) the value of the Trail Creek area as a biological corridor between adjacent wilderness and roadless areas and (2) the biodiversity of the Trail Creek area and surrounding lands as it might be affected by habitat fragmentation. The report considered potential impacts in the context of the natural disturbance process, such as fire and insects, that have continually altered the distribution and abundance of mature forest and associated wildlife and plant species in the Trail Creek area since the retreat of the Pleistocene glaciers about 10,000 years ago.

Ecosystem processes at the landscape level have traditionally been overlooked, but are now considered among the resources most likely to be affected cumulatively by multiple activities. The Forest Service and other agencies are now applying an ecosystem approach to many NEPA analyses to better consider these resources. Other examples include the Draft Supplemental EIS on Management of Habitat for Late-Successional and Old-Growth Forest Related Species (Forest Service and BLM, 1993) and the current Draft EISs for the Interior Columbia Basin Management Project (Forest Service and BLM, 1997). The Federal Highway Administration (1996) is also beginning to apply an analogous system approach to the impact assessment of human communities.

4.2 Geographic Boundaries and Time Period

EPA Review Approach

Geographic boundaries and time periods used in cumulative impact analysis should be based on all resources of concern and all of the actions that may contribute, along with the project effects, to cumulative impacts. Generally, the scope of analysis will be broader than the scope of analysis used in assessing direct or indirect effects. To avoid extending data and analytical requirements beyond those relevant to decision making, a practical delineation of the spatial and temporal scales is needed. The selection of geographic boundaries and time period should be, whenever possible, based on the natural boundaries of resources of concern and the period of time that the proposed action's impacts will persist, even beyond the project life. EPA reviewers should determine whether the NEPA analysis has used geographic and time boundaries large enough to include all potentially significant effects on the resources of concern. The NEPA document should delineate appropriate geographic areas including natural ecological boundaries, whenever possible, and should evaluate the time period of the project's effects.

Discussion

Spatial and temporal boundaries should not be overly restricted in cumulative impact analysis. Agencies tend to limit the scope of their analyses to those areas over which they have direct authority or to the boundary of the relevant management area or project area. This is often inadequate because it may not cover the extent of the effects to the area or resources of concern. The most common temporal scope is the life of the project. This may not be appropriate if the effects last longer than the project's useful life.

The EPA reviewer can determine an appropriate spatial scope of the cumulative impact analysis by considering how the resources are being affected. This determination involves two basic steps:

- (1) Identifying a geographic area that includes resources potentially affected by the proposed project and
- (2) Extending that area, when necessary, to include the same and other resources affected by the combined impacts of the project and other actions.

In practice, the areas for several target species or components of the ecosystem can often be captured by a single ecoregion or watershed. For example, an impact assessment for a forest plan modification may have to be expanded beyond its administrative forest management unit. Instead, the scope of the assessment might consider the entire watershed for the area covering portions of wilderness areas, national or state parks, other federal lands, and private holdings. Boundaries would be based on the resources of concern and the characteristics of the specific area to be assessed. Examples include stream sections important for salmonid feeding or spawning that are within or downstream of the administrative unit; maintenance of disturbance patterns to ensure structural and functional integrity of regional forests; and biological corridors and wildlife habitat that connect public and private lands. For practical purposes, ecological boundaries may need to be combined with political boundaries to adequately delineate the assessment area.

NEPA Example: The Final Supplemental EIS on Management of Habitat for Late-Successional and Old-Growth Forest Related Species (Forest Service and BLM, 1994) is an important example of study boundaries combining administrative units with natural regions. The planning area for the EIS included all lands administered by the Forest Service and the Bureau of Land Management within the range of the northern spotted owl. This species range matched well with the ecosystem consisting of late-successional and old-growth forest in the region.

EPA reviewers should recommend that the proper spatial scope of the analysis include geographic areas that sustain the resources of concern. Importantly, the geographical boundaries should not be extended to the point that the analysis becomes unwieldy and useless for decision-making. In many cases, the analysis should use an ecological region boundary that focuses on the natural units that constitute the resources of concern. Three examples of classifications of ecological regions that may be useful for large geographic areas include Omernik's EPA ecoregions (Omernik, 1989), Bailey's Forest Service ecoregions (Bailey, 1978), and the USGS hydrologic units or watersheds. The Natural Resources Conservation Service uses delineated areas termed Major Land Resources Areas that are based on soil types, climate, geology, topography, and hydrology. For non-ecological resources, other geographic areas, such as historic districts (for cultural resources) or metropolitan areas (for economics), should be used.

NEPA Example: the Draft EIS on the Special Area Management Plan (SAMP) for the Hackensack Meadowlands District, NJ (EPA and Army Corps of Engineers, 1995) is another example of creating a study area that considers both political boundaries and natural boundaries for both management utility and resource relevance. The plan covers an area with 14 municipalities in two counties that are experiencing continual pressure for development. Prepared by the U.S. EPA, U.S. Army Corps of Engineers, and Hackensack Meadowlands Development Commission, the draft EIS assesses the cumulative impacts of development scenarios within an area that includes 8,500 acres of wetlands that, because of their position in the landscape, "perform a number of significant ecological functions and support a diverse community of associated wildlife."

Determining the temporal scope requires estimating the length of time the effects of the proposed action will last. More specifically, this length of time extends as long as the effects may singly, or in combination with other anticipated effects, be significant on the resources of concern. At the point where the contribution of effects of the action, or combination of all actions, to the cumulative impact is not significant the analysis should stop. Because the important factor in determining cumulative impact is the condition of the resource (i.e., to what extent it is degraded), analysis should extend until the resource has recovered from the impact of the proposed action.

For example, an impact assessment of ground water withdrawals to cool power plant turbines should go beyond determining whether the capacity of the aquifer is adequate to provide water for the life of the power plant. The analysis should also consider the long-term effects of lowering the aquifer level. Should municipal drinking water and agricultural irrigation withdrawals increase in the future, the cumulative effect of the power plant withdrawals may lower aquifer levels to the point where, at predictable intervals in the future, droughts will eliminate all supply. The NEPA document may, therefore, have to consider time periods beyond the life of the power plant.

NEPA Example: The Final Supplemental EIS on Management of Habitat for Late-Successional and Old-Growth Forest Related Species (Forest Service and BLM, 1994) looked sufficiently forward in time to address the probability of restoring or maintaining sustainable ecosystem conditions. The forest draft EIS determined that previous alterations to the regional ecosystem prevented a return to pre-settlement landscape condition or recovery of aquatic resources within the next 100 years, but that the selected alternative would reverse a 50-year trend toward degradation.

There are no set or required formulas for determining the appropriate scope of the cumulative impact analysis. Both geographic boundaries and time periods need to be defined on a case-by-case basis. Determining the boundaries and periods depends on the characteristics of the resources affected, the magnitude and scale of the project's impacts, and the environmental setting. In practice, a combination of natural and institutional boundaries may be required to adequately consider both potential impacts and possible mitigation measures. Ultimately, the scope of the analysis will depend on an understanding of how the effects are occurring in the assessment area.

4.3 Past, Present, and Reasonably Foreseeable Future Actions

EPA Review Approach

The adequacy of cumulative impact analysis depends on how well the analysis considers impacts that are due to past, present, and reasonably foreseeable actions. EPA reviewers should determine whether the cumulative analysis adequately considered the following:

- 1) Whether the environment has been degraded, and if so, to what extent:
- 2) Whether ongoing activities in the area are causing impacts; and
- 3) The trends for activities and impacts in the area.

Considering the past, present, and reasonable foreseeable future actions provides a needed context for assessing cumulative impacts. The inclusion of other actions occurring in proximity to the proposed action is a necessary part of evaluating cumulative effects. Agencies should identify activities occurring outside of their jurisdiction that are affecting the same resources being affected by their actions. Consultation with other agencies potentially affecting the resources of concern is not usually done and a consideration of private activities seldom occurs. In addition, agencies may not always include other actions taken by their agency. EPA reviewers should determine whether the NEPA document considered all past, present, and future actions that contribute to significant cumulative effects on the resources of concern. The analysis should include the use of trends information and interagency analyses on a regional basis to determine the combined effects of past, present, and future actions. NEPA documents should only consider those past, present, and future actions that incrementally contribute to the cumulative effects on resources affected by the proposed action. Actions affecting other resources, or with cumulatively insignificant effects on the target resources, do not add to the value of the analysis.

Discussion

To successfully assess cumulative impacts, NEPA documents should consider a broad range of activities and patterns of environmental degradation that are occurring in the vicinity of the project. The following considerations (as modified from Klein and Kingsley, 1994) can assist in identifying actions that may relate to the project under review:

- 1) The proximity of the projects to each other either geographically or temporally;
- 2) The probability of actions affecting the same environmental system, especially systems that are susceptible to development pressures;
- 3) The likelihood that the project will lead to a wide range of effects or lead to a number of associated projects; and

- 4) Whether the effects of other projects are similar to those of the project under review.
- 5) The likelihood that the project will occur -- final approval is the best indicator but long range planning of government agencies and private organizations and trends information should also be used;
- 6) Temporal aspects, such as the project being imminent;

As an example, the cumulative effect of transportation projects and other development in an urban setting often results in alteration of topography, habitat fragmentation, changes in water flows and water quality, increased sediment and contaminant runoff, and direct mortality from road kills. To address these issues, the actions included should start with the proposed project but also include other present, past, and future actions. Other current development should include related construction such as shopping malls within proximity of the new road construction or upgrades undertaken on connecting roads within the area of study. Past actions that should be considered include, for example, any housing and commercial development, alteration of hydrologic flows to control flooding, filling of wetlands, construction of other highways, and upstream development. The analysis should also extend further back in time to include previous changes to the area and region such as resource extraction or agricultural activities. Future actions should include any planned communities or commercial areas, induced growth and accompanying infrastructure, projected increase in population and traffic, and road expansion.

The identification of the effects of past actions is critical to understanding the environmental condition of the area. Knowing whether the resource is healthy, declining, near collapse, or completely devastated is necessary for determining the significance of any added impacts due to the proposed project. The NEPA document should consider how past activities have historically affected and will continue to detrimentally affect the resources of concern. How far back in time to consider depends on how long the resources of concern have been affected. Trends analysis, or how the resource condition has changed over time, is the most useful tool for looking at the accumulated effect of past actions. For example, if 50% of the wetland functions in a basin have been lost due to both agriculture and urban development, any present or future impacts should be taken into account in determining impacts to flood storage capacity and other important wetland functions.

Other present actions that may be detrimentally affecting the resources of concern need to be considered at the same time impacts of the proposed action are considered. NEPA documents should consider information on all other relevant activities in the study area including other actions of the proposing agency, actions of other federal agencies, actions of state and local governments, and private actions. While EPA already monitors federal activities on a regional basis, state and county resources should be used to monitor local and private activities.

The identification of future actions is also important. According to the response for question 18 of the "Forty Most Asked Questions concerning CEQ's NEPA Regulations"

(CEQ, 1981), the NEPA document "must identify all the indirect effects that are known, and make a good faith effort to explain the effects that are not known but are 'reasonably foreseeable'." The critical question is "What future actions are reasonably foreseeable?" Court decisions on this topic have generally concluded that reasonably foreseeable future actions need to be considered even if they are not specific proposals. The criterion for excluding future actions is whether they are "speculative." The NEPA document should include discussion of future actions to be taken by the action agency. The analysis should also incorporate information based on the planning documents of other federal agencies, and state and local governments. For example, projects included in a 5-year budget cycle might be considered likely to occur while those only occurring in 10-25 year strategic planning would be less likely and perhaps even speculative. For private actions, the analysis should use regional and local planning documents. In the absence of these plans (and to refine expectations where activities have diverged from the plans), the analysis should refer to projected development trends. In all of these cases, the best information should be used to develop scenarios that predict which future actions might reasonably be expected as a result of the proposal.

NEPA Example: The Commencement Bay Natural Resource Damage Assessment: Restoration Plan and Final Programmatic EIS (FWS and NOAA, 1997) addressed the problem of including the many and various past actions by quantifying the previous loss of 98% of mudflat and marsh habitat through a combination of historical records and photographic evidence. The Final EIS for the Castle Mountain Project, San Bernardino County, CA (BLM 1990) considered 26 other existing and proposed activities that might cumulatively affect 12 resources of concern. The potential impact of activities in the categories of utilities/services, commercial and residential, recreation, mining, and grazing were evaluated based on their location and which resources they might affect. The Draft EIS for the Disposal and Reuse of Naval Base, Philadelphia, PA (Department of the Navy, 1995) addressed "connected, cumulative, and similar existing and potential actions," including general growth trends in South Philadelphia, other land use development initiatives, related actions by other DoD services, realignment of the Naval Base, proposed leasing of shipyard facilities to private shipbuilders, and significant, proposed off-base transportation improvements.

4.4 Describing the Condition of the Environment

EPA Review Approach

The NEPA analysis should establish the magnitude and significance of cumulative impacts by comparing the environment in its naturally occurring state with the expected impacts of the proposed action when combined with the impacts of other actions. Use of a "benchmark" or "baseline" for purposes of comparing conditions is an essential part of any environmental analysis. "The concept of a baseline against which to compare predictions of the effects of the proposed action and reasonable alternatives is critical to the NEPA process." (CEQ, 1997) To determine how the project will affect the resource's ability to sustain itself, the NEPA document should include a description of the baseline condition that considers "...how conditions have changed over time and how they are

likely to change in the future without the proposed action". (CEQ, 1997) If it is not possible to establish the "naturally occurring" condition, a description of a modified but ecologically sustainable condition can be used in the analysis. In this context, ecologically sustainable means the system supports biological processes, maintains its level of biological productivity, functions with minimal external management, and repairs itself when stressed.

While a description of past environmental conditions is usually included in NEPA documents, it is seldom used to fully assess how the system has changed from previous conditions. The comparison of the environmental condition and expected environmental impacts can be incorporated into the environmental consequences or affected environment sections of NEPA documents. EPA reviewers should determine whether the NEPA analysis accurately depicts the condition of the environment used to assess cumulative impacts. In addition, reviewers should determine whether NEPA documents incorporate the cumulative effects of all relevant past activities into the affected environment section. For the evaluation of the environmental consequences to be useful, it is important that the analysis also incorporate the degree that the existing ecosystem will change over time under each alternative.

Discussion

Often the current condition is used as the benchmark for comparing the environmental effects of the alternatives. However, the current condition typically may not adequately represent how actions have impacted resources in the past and present or how resources might respond to future impacts. Designating existing environmental conditions as a benchmark may focus the environmental impact assessment too narrowly, overlooking cumulative impacts of past and present actions or limiting assessment to the proposed action and future actions (McCold and Saulsbury 1996). For example, if the current environmental condition were to serve as the condition for assessing the impacts of relicensing a dam, the analysis would only identify the marginal environmental changes between the continued operation of the dam and the existing degraded state of the environment. In this hypothetical case, the affected environment has been seriously degraded for more than 50 years with accompanying declines in flows, reductions in fish stocks, habitat loss, and disruption of hydrologic functions. If the assessment took into account the full extent of continued impacts, the significance of the continued operation would more accurately express the state of the environment and thereby better predict the consequences of relicensing the dam.

For the purposes of section 309 reviews, different methods of depicting the environmental condition are acceptable. The condition of the environment should, however, address one or more of the following:

- 1) How the affected environment functions naturally and whether it has been significantly degraded;

- 2) The specific characteristics of the affected environment and the extent of change, if any, that has occurred in that environment; and
- 3) A description of the natural condition of the environment or, if that is not available, some modified, but ecologically sustainable, condition to serve as a benchmark.

Two practical methods for depicting the environmental condition include use of the no-action alternative and an environmental reference point. Historically, the no-action alternative (as reflecting existing conditions) has usually been used as a benchmark for comparing the proposed action and alternatives to existing conditions. The no-action alternative can be an effective benchmark if it incorporates the cumulative effects of past activities and accurately depicts the condition of the environment.

Another approach for describing the environmental condition is to use an environmental reference point that would be incorporated into the environmental consequences and affected environment sections of the document. The natural condition of the ecosystem, or some modified but sustainable ecosystem condition, can be described as the environmental reference point. In analyzing environmental impacts, this environmental reference point would not necessarily be an alternative. Instead, it would serve as a benchmark in assessing the environmental impacts associated with each of the alternatives. Specifically, the analysis would evaluate the degree of degradation from the environmental reference point (i.e., natural ecosystem condition) that has resulted from past actions. Then the relative difference among alternatives would be determined for not only changes compared to the existing condition but also changes critical to maintaining or restoring the desired, sustainable condition.

Determining what environmental condition to use in the assessment may not be immediately clear. Choosing and describing a condition should be based on the specific characteristics of the area. In addition, the choice of condition can be constrained by limited resources and information. For these reasons, the environmental condition described by the environmental reference point or no-action alternative should be constructed on a case-by-case basis so that it represents an ecosystem able to sustain itself in the larger context of activities in the region. In this respect, there is no predetermined point in time that automatically should represent the environmental condition. In addition, it may not be practical to use a pristine condition in situations of intensive development. For example, it may not be very useful to use a pre-development condition to assess the extent of degradation in a heavily urbanized setting. It may be more useful in this situation to consider the condition of several important resources of concern (i.e., water quality, air quality, or quality of life) in comparison with expected environmental consequences of the action. Since most ecosystems can be delineated and have distinct characteristics, determination of the environmental condition does not need to be a subjective process leading to speculation about the condition of the environment before it was degraded.

Depending on whether the information is reasonably obtainable, the environmental condition chosen may be a pristine environment, or at the very least, a minimally

functioning ecosystem that will not further degrade. The use of the environmental condition to compare alternatives is not an academic exercise, but one that can most effectively modify alternatives and help decision making. Examples of conditions might include before project, before "substantial" development, or a reference ecosystem that is comparable to the project area. Selecting the best environmental condition for comparative purposes can be based on the following:

- 1) Consider what the environment would look like or how it would behave without serious human alteration;
- 2) Factor in the dynamic nature of the environment;
- 3) define the distinct characteristics and attributes of the environment that best represent that particular type of environment (focus on characteristics and attributes that have to do with function); and
- 4) Use available or reasonably obtainable information.

For example, in a hypothetical case of harbor dredging and disposal, the existing condition of the aquatic ecosystem is highly modified from natural conditions. Human settlement along major waterways spans hundreds of years and commercial development has become very intense in many areas. Following practices used in some NEPA analyses, the degraded condition of the benthic communities and shoreline vegetation would be considered the condition for assessing the impacts of sediment dredging and disposal. By using this environmental condition, the analysis would not recognize the full extent of the degradation and would possibly underestimate the actual impacts of the proposed action. The environmental condition for this case could be set at pre-development (or at least at early development) or, if historical data are not available, use a reference point constructed from an understanding of how a similar ecosystem would behave in a natural state. The affected environment section should include a discussion of the extent of degradation that the current condition has experienced when compared to the characteristics of an undisturbed harbor environment. And finally, the extent of change and future trends should be considered in each alternative.

NEPA Example: The Forest Service's Snowmass Ski Area Final Environmental Impact Statement (Forest Service, 1994) and the Army Corps of Engineers Elk Creek Lake Final Environmental Impact Statement (Army Corps of Engineers, 1991) both define baseline conditions for comparison of alternatives. In assessing the potential environmental impacts of the Snowmass Ski Area expansion, the Forest Service established a "pre-development" reference point from which all past, present, and reasonably foreseeable future environmental impacts were examined. Consequently, the EIS presented a comprehensive discussion of the cumulative impacts upon various resources. The Elk Creek Lake Final EIS also identified a "pre-development" reference point, defined by the Corps as "base conditions", for specific resources along the Rogue River and Elk Creek. The assessment then explored the alteration of resource conditions with respect to other actions, including the proposed project.

Issue 4.5 Using Thresholds to Assess Resource Degradation

EPA Review Approach

Qualitative and quantitative thresholds can be used to indicate whether a resource(s) of concern has been degraded and whether the combination of the action's impacts with other impacts will result in a serious deterioration of environmental functions. In the context of EPA reviews, thresholds can be used to determine if the cumulative impacts of an action will be significant and if the resource will be degraded to unacceptable levels. EPA reviewers should determine whether the analysis included specific thresholds required under law or by agency regulations or otherwise used by the agency. In the absence of specific thresholds, the analysis should include a description of whether or not the resource is significantly affected and how that determination was made.

Discussion

If adequate data and analytical procedures are available, specific thresholds that indicate degradation of the resources of concern should be included in the NEPA analysis. The thresholds should be practical, scientifically defensible, and fit the scale of the analysis. Thresholds may be set as specific numerical standards (e.g., dissolved oxygen content to assess water quality), qualitative standards that consider biological components of an ecosystem (e.g., riparian condition and presence of particular biophysical attributes), and/or desired management goals (e.g., open space or unaltered habitat). Thresholds should be represented by a measurement that will report the change in resource condition in meaningful units. This change is then evaluated in terms of both the total threshold beyond which the resource degrades to unacceptable levels and the incremental contribution of the proposed action to reaching that threshold. The measurement should be scientifically based. For example, thresholds for determining adverse change in the functioning of a wetland could include the percentage of historic wetland loss in the region, occurrence of species at risk, ambient water quality data that exceed standards, and estuarine pollution susceptibility index.

Since cumulative impacts often occur at the landscape or regional level, thresholds should be developed at similar scales whenever possible. Indicators at a landscape level can be used to develop thresholds as well as assess the condition of the environment. By using the following landscape indicators as modified from O'Neil et al. (1997) and Jones et al. (1996), thresholds can be crafted by determining the levels, percentages, or amount of each that indicate a significant impact for a particular area. Examples of thresholds include:

- The total change in land cover is a simple indicator of biotic integrity; thresholds for areas with high alterations would generally be lower than areas that are not as degraded; if open space or pristine areas are a management goal then the threshold would be a small percentage change in land cover.

- Patch size distribution and distances between patches are important indicators of species change and level of disturbance. Thresholds would be set to determine the characteristics of an area needed to support a given plant or animal species.
- Estimates of fragmentation and connectivity can reveal the magnitude of disturbance, ability of species to survive in an area, and ecological integrity. Thresholds would indicate a decrease in cover pattern, loss of connectivity, or amount of fragmentation that would significantly degrade an area.
- Indicators of water quality and watershed integrity can be used to set thresholds. Specific concentrations and levels of nitrogen, phosphorous, turbidity, dissolved oxygen, and temperature can be used.
- Thresholds for a decline in water quality can take the form of size and amount of riparian buffer zones. Condition of riparian zones and changes in percent of buffer areas can indicate a decline in water quality due to soil erosion, sediment loading, and contaminant runoff.

In a hypothetical project to develop a skiing resort to be constructed on federal lands, thresholds would be developed for several resources of concern. The impacts of road construction and use, ski runs, housing development, and water use would have wide ranging effects on resources such as riparian condition, water quality, wildlife habitat, and vegetation. Thresholds for cover and loss of connectivity could be developed to determine the significance of impacts to wildlife and vegetative cover. For example, thresholds could be developed from known information on the amount of habitat necessary for successful ungulate breeding. Numerical standards for dissolved oxygen and water temperature could be used to determine significance of impacts to coldwater fisheries. Narrative standards of stream condition would be used to determine thresholds for successful fish spawning.

NEPA Example: NEPA analyses have examined actions where the cumulative effects exceed a threshold which is tied to a national air quality or water quality standard. In the Final EIS for Hydroelectric Development in the Upper Ohio River Basin (FERC, 1988), the Federal Energy Regulatory Commission determined the point at which dissolved oxygen fell below the standard by modeling the reduced spillage and aeration caused by adding turbines to additional dams in succession. Setting thresholds to represent the carrying capacity of an ecosystem is more difficult. In the Draft EIS on Cumulative Impacts of Recreational Boating on the Fox River and Chain O'Lakes Area in Lake and McHenry Counties, IL, the U.S. Army Corps of Engineers assessed the impacts of boat traffic on the carrying capacity of aquatic life by setting a threshold of water clarity needed for vegetation growth. At the same time, they set a social carrying capacity threshold of the number of boats that made people feel crowded. While the concept of translating exceedence of thresholds to significant impacts on carrying capacities of both ecological and human resources is being applied more extensively, analysts still often face situations where there are limits to scientifically exact thresholds, and have to use

other methods to develop thresholds. For example, in the Draft Supplemental EIS on Management of Habitat for Late-Successional and Old-Growth Forest Related Species (Forest Service and BLM, 1993), it was necessary to rely on expert opinion from panels to assess the "probability of ensuring the viability of species."

Determining a threshold beyond which cumulative effects significantly degrade a resource, ecosystem, or human community is sometimes very difficult because of a lack of data. Without a definitive threshold, the NEPA practitioner should compare the cumulative effects of multiple actions with appropriate national, regional, state, or community goals to determine whether the total effect is significant. These desired conditions can best be defined by the cooperative efforts of agency officials, project proponents, environmental analysts, non-governmental organizations, and the public through the NEPA process. The integrity of historical districts is an example of a threshold that is goal related. These districts, especially residential and commercial historic districts in urban areas, are particularly vulnerable to clearance programs carried out by local governments, usually with use of federal funds. Though individual structures of particular architectural distinction are often present, such districts are important because they are a collection of structures that relate to one another visually and spatially; the primary importance of each building is the contribution that it makes to a greater whole. Often in conjunction with code enforcement programs to remove blighting influences and /or hazards to public safety, local governments condemn and demolish properties. Viewed in isolation as an individual action, such demolition of an individual structure does not significantly diminish the historic and architectural character of the district and indeed may be beneficial to the overall stability of the district. But the cumulative effect of a whole series of such demolitions can significantly erode the district. Continued loss of historic structures, often with resultant vacant lots and incompatible new construction, can reach a point where the visual integrity of the district is lost. Once this threshold is passed, subsequent demolitions become increasingly difficult to resist and ultimately the qualities of the historic district are lost.

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Exhibit 2200-3 Questions and Answers Regarding the Consideration of Indirect and Cumulative Impacts in the NEPA Process

Introduction

The FHWA and other Federal agencies' responsibility to address and consider direct, indirect, and cumulative impacts in the NEPA process was established in the Council of Environmental (CEQ) Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act (40 CFR §§1500-1508). To provide the proper context on this subject and to fully appreciate the discussion in these *Question and Answers*, we first need to examine some basic principles of the National Environmental Policy Act (NEPA) (42 U.S. C. 4321 et seq.).

In 1970, NEPA introduced a national environmental policy into the normal business practices of the Federal government. The law intentionally focused on Federal activities with respect to its goal for a sustainable environment balanced with other essential needs of present and future generations of Americans. NEPA did not alter the missions of Federal agencies. Instead, it established a supplemental mandate for Federal agencies to examine the potential environmental consequences of their proposals, consult with other agencies, document the analysis, and make the information available to the public prior to making a decision.

The environmental policy established in NEPA (*Section 101*) is supported by a set of “action forcing” provisions (*Section 102*) that form the basic framework of Federal decision making known as the NEPA process. While NEPA established the basic framework for integrating environmental considerations into Federal decisions, it did not provide the details of a process for Federal agencies to follow. Federal implementation of NEPA was the charge of the CEQ, which interpreted the law and addressed the action forcing provisions in the form of regulations and guidance, the bulk of which is focused on the preparation of environmental impact statements (EIS). CEQ defined categorical exclusions (CE) and environmental assessments (EA) but the specifics were left for the agencies to address in individual supplemental regulation and guidance.

Decisions resulting from NEPA litigation have influenced the evolution of NEPA implementation. While the general environmental protection provisions of NEPA may seem explicit and clear to some, courts have interpreted the mandates of the law as “procedural” rather than “substantive”, Robertson v. Methow Valley Citizens Council, 490 U.S. 332, 350 (1989). This means that NEPA directs the way in which Federal Agencies must make decisions concerning proposals that adversely impact the environment but does not require a particular conclusion or direct what decision must be made. The courts concluded that Federal agencies must take a reasonable “hard look” at their proposals in light of available information, analysis, and the potential for environmental impacts in making informed decisions to implement an action or alternative, Kleppe v. Sierra Club, 427 U.S. 390 (1976). Inherent in the hard look provision is the necessity to consider and examine the appropriate issues using the most appropriate expertise and methodology available.

Understanding the basic intent of NEPA, the provisions of the CEQ regulations, and the standards established in case law is essential to overall NEPA compliance. Where indirect and cumulative impacts are a concern it must also be recognized that other statutory or regulatory mandates include secondary, indirect, and/or cumulative impact requirements. This is briefly discussed in the answer to *Question 11*. These terms have different meanings and procedural expectations, with respect to other regulations and their subject resources, from those of the overall NEPA process. Two examples include the regulations implementing the Endangered Species Act (ESA) and Section 404 of the Clean Water Act (CWA). These differences are important in the NEPA

project development process and overall project decision making process. These *Questions and Answers* primarily address indirect and cumulative impact considerations in the context of the NEPA process.

Questions and Answers

1. How and where are direct, secondary, indirect, and cumulative effects and impacts defined?

The CEQ regulations (40 CFR §§ 1500 -1508) define the impacts and effects that must be addressed and considered by Federal agencies in satisfying the requirements of the NEPA process. This includes direct, indirect and cumulative impacts:

Direct effects are caused by the action and occur at the same time and place. (40 CFR § 1508.8)

Indirect effects are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems. (40 CFR § 1508.8)

Cumulative impact is the impact on the environment, which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. (40 CFR § 1508.7)

The terms “effect” and “impact” are used synonymously in the CEQ regulations (40 CFR §1508.8). “Secondary impact” does not appear, nor is it defined in either the CEQ regulations or related CEQ guidance. However, the term is used in the FHWA’s *Position Paper: Secondary and Cumulative Impact Assessment In the Highway Project Development Process* (April, 1992) but is defined with the CEQ definition of indirect impact (40 CFR § 1508.8). Some authors on this subject have distinguished secondary impacts from indirect impacts, while others; including the FHWA have used the terms interchangeably. For purposes of this guidance, secondary and indirect impacts mean the same thing.

2. Are there substantive differences between indirect impacts and cumulative impacts and requisite NEPA requirements?

The terms indirect impact and cumulative impact are often used as if they mean the same thing. However, there are important differences in the meaning and requirements related to indirect impacts and cumulative impacts in the NEPA process. Understanding the distinctions is the first step to ensuring that the relative requirements are given appropriate and adequate treatment in the NEPA process and subsequent environmental documentation. The differences and relationships are highlighted in the following discussion, examples, and figures.

A **cumulative impact** includes the total effect on a natural resource, ecosystem, or human community due to past, present, and future activities or actions of Federal, non-Federal, public, and private entities. Cumulative impacts may also include the effects of natural processes and events, depending on the specific resource in question. Cumulative impacts include the total of all impacts to a particular resource that have occurred, are occurring, and will likely occur as a result of any action or influence, including the direct and reasonably foreseeable indirect impacts of a

Federal activity. Accordingly, there may be different cumulative impacts on different environmental resources. This is illustrated in Figure 1.

Cumulative impact analysis is resource specific and generally performed for the environmental resources directly impacted by a Federal action under study, such as a transportation project. However, not all of the resources directly impacted by a project will require a cumulative impact analysis. The resources subject to a cumulative impact assessment should be determined on a case-by-case basis early in the NEPA process, generally as part of early coordination or scoping.

Cumulative impact analysis may be thought of as a comparison of the past, present, and reasonable foreseeable health or condition of a specific resource as described in the following air quality example.

The air quality of an area today is in a measurable condition, relative to the National Ambient Air Quality Standards (NAAQS). In the past, perhaps recently, the quality of the air may have been worse, the same, or better than it is today depending on a number of factors such as automobile use, industry, residential development (fireplaces), and climatic conditions. Each of these individual factors may have influenced the positive or negative change in the air quality of the area. The condition of the air today is the result of these factors, which constitutes the past effects of the cumulative impact question. Add the impacts of the proposed project, other occurring activities, and the positive and negative reasonably foreseeable impacts from any source (some of which may be indirect) and the result equates to the air quality cumulative impact.

In the NEPA process, a similar consideration or analysis would be performed for other resources potentially impacted by the implementation of a proposed project.

Indirect impacts as well as direct impacts, can be considered a subset of cumulative impacts, as illustrated in Figure 1., but are distinguished by an established cause and effect relationship to a proposed Federal action, such as a transportation project.

Figure 2. is an illustration and comparison of the cause and effect relationship of direct impacts and indirect impacts to a project action. As the name implies, direct impacts are those that are actually caused by project activities. Indirect impacts, on the other hand, are caused by another action or actions that have an established relationship or connection to the project. These induced actions are those that would not or could not occur except for the implementation of a project. These actions are often referred to as “but for” actions and generally occur at a later time or some distance removed from the original action.

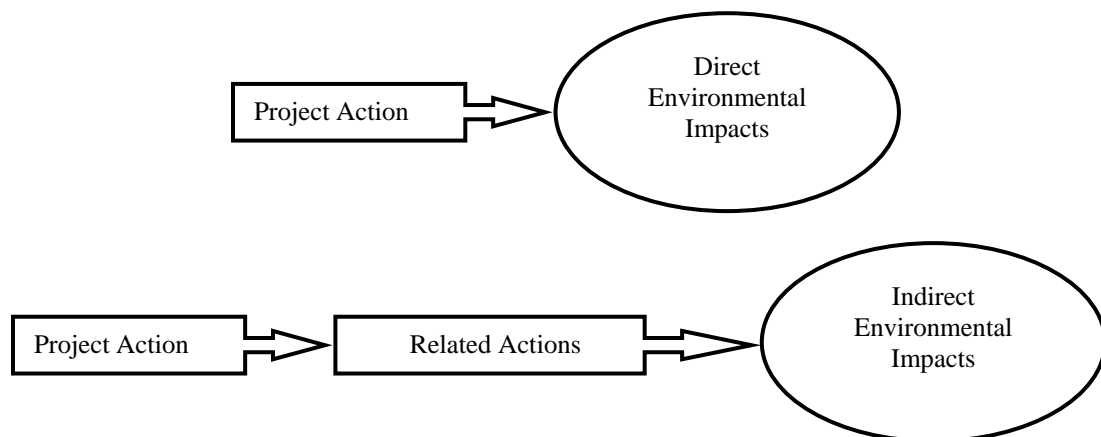


Figure 2. Direct and Indirect Impact Diagrams

From the CEQ definition we find that indirect effects “may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems” (40 CFR § 1508.8). The key words in this explanation are “related” and “induced”.

Changes in land use patterns, growth or decline, in a given locale are attributable to many circumstances, events, and activities including Federal, non-Federal, and private actions. While transportation projects are not the only or primary factor in possible land use changes, the potential for certain transportation proposals to influence land use is undeniable. The same is true for other infrastructure improvements such as water supply, sewer, and/or utilities.

A proposal for a new alignment project in an area where no transportation facility currently exists, or one that adds new access to an existing facility may indicate the potential for project related indirect impacts from other distinct but connected actions. Likewise, the purpose and need of a proposed project that includes a development or economic element might establish an indirect relationship to potential land use change or other action with subsequent environmental impacts. The potential relationship of a transportation proposal to indirect impacts must be established on a case-by-case basis, early in the NEPA project development process.

3. The CEQ regulations define indirect and cumulative impacts to include the effects of “reasonably foreseeable” actions. How is “reasonably foreseeable” defined and related to indirect and cumulative impact analysis?

The determination or estimation of future impacts is essential to both indirect and cumulative impact analysis. However, the focus must be on reasonably foreseeable actions, those that are likely to occur or probable, rather than those that are merely possible. For a better understanding of what reasonably foreseeable means in NEPA analysis, we turn our attention to court cases and decisions that have dealt with the adequacy of reasonably foreseeable analysis in the NEPA process.

In Dubois v U.S. Dept. of Agriculture, 102 F.3d 1273, 1286 (1st Cir 1996), the court concluded that when attempting to define indirect impacts, “the agency need not speculate about all conceivable impacts but it must evaluate the reasonably foreseeable effects of the proposed action.”

In Sierra Club v. Marsh, 976 F.2d 763, 767 (1st Cir. 1992), the court reviewed the issue of whether a particular indirect (secondary) impact was “sufficiently likely to occur, that a person of ordinary prudence would take it into account in making a decision”.

These cases indicate that indirect and cumulative impact analyses are appropriately concerned with impacts that are sufficiently “likely” to occur and not with the speculation of any impact that can be conceived of or imagined.

The CEQ guidance, *Questions and Answers About the NEPA Regulations*, also referred to as *Forty Most Asked Questions Concerning CEQ's NEPA Regulations*, 46 Fed. Reg. 18026 (March 23, 1981) (40 *Questions and Answers*), discusses the meaning of reasonably foreseeable. The answer to Question 18, in the CEQ guidance deals with the uncertainty of indirect impacts. This guidance also applies to cumulative impacts, since that definition uses the same reasonably foreseeable provision. The guidance states:

“The EIS must identify all the indirect effects that are known, and make a good faith effort to explain the effects that are not known but are "reasonably foreseeable." (40 CFR §1508.8(b)). In the example, if there is total uncertainty about the identity of future land owners or the nature of future land uses, then of course, the agency is not required to engage in speculation or contemplation about their future plans. But, in the ordinary course of business, people do make judgments based upon reasonably foreseeable occurrences. It will often be possible to consider the likely purchasers and the development trends in that area or similar areas in recent years; or the likelihood that the land will be used for an energy project, shopping center, subdivision, farm or factory. The agency has the responsibility to make an informed judgment, and to estimate future impacts on that basis, especially if trends are ascertainable or potential purchasers have made themselves known. The agency cannot ignore these uncertain, but probable, effects of its decisions.”

From this we find that reasonably foreseeable events, although still uncertain, must be probable. This means that those effects that are considered possible, but not probable, may be excluded from NEPA analysis. There’s an expectation in the CEQ guidance that judgments concerning the probability of future impacts will be informed, rather than based on speculation.

The confident prediction of reasonably foreseeable impacts requires judgment based on information obtained from reliable sources. Coordination with local land use agencies and officials, including the review of adopted plans and similar instruments or documentation, if available, are important in this regard. Surveys and consultation with local landowners, developers, real estate agencies, or other individuals with special expertise within the proximity of the project study area can yield useful information. In a State, or region within a State, where growth management laws exist, the restrictions and requirements of those laws should be acknowledged and taken into consideration.

Potential changes in land use, development, or other reasonably foreseeable actions are not easy to predict. Estimates may be arrived at with surveys, discussions with appropriate local entities, the examination of trends, the use of sophisticated computer models or other appropriate methodology, such as the Delphi process. The Delphi method, modified Delphi method, or other “expert panel” approaches have been used to forecast reasonable foreseeable land uses for several recent transportation studies.

These or other methodologies may be appropriate for a given study, depending the type of project proposed, the geographic location, the resources involved, and other determining factors. Other important considerations include the existence of a formal planning process, local zoning regulations, land use codes or regulations, and other land use controls. Because project situations vary greatly, it is not possible to recommend a single methodology or standard approach that will be appropriate in every situation. This decision should be made on a case-by-case basis during early coordination or scoping.

Considerations related to selection of the most appropriate supporting methodology for a particular study should be coordinated with cooperating agencies and participants in the NEPA process during early coordination and scoping. Generally, the determination of an appropriate methodology for a given situation and project, should not need to be revisited, if the decision was made cooperatively and early in the NEPA process. It is recommended that every effort be made to reach agreement or consensus with project participants regarding the appropriate methodology, but it must be understood that the final decision is the responsibility of the lead agency. Courts in

NEPA review have relied on the expertise of the lead Federal agency and have given considerable deference to their choice of technical experts and methodology, unless it can be shown there were obvious errors and omissions in the data supporting the agency's decision.

4. Since data and information is essential to determining reasonably foreseeable actions, what is our responsibility when specific essential information is unavailable or incomplete?

The CEQ regulations (40 CFR § 1502.22) address Federal responsibility in situations where relevant information is either incomplete or unavailable related to the preparation of environmental impact statements:

- (a) If the incomplete information relevant to reasonably foreseeable significant adverse impacts is essential to a reasoned choice among alternatives and the overall costs of obtaining it are not exorbitant, the agency shall include the information in the environmental impact statement.
- (b) If the information relevant to reasonably foreseeable significant adverse impacts cannot be obtained because the overall costs of obtaining it are exorbitant or the means to obtain it are not known, the agency shall include within the environmental impact statement:
 - (1) a statement that such information is incomplete or unavailable;
 - (2) a statement of the relevance of the incomplete or unavailable information to evaluating reasonably foreseeable significant adverse impacts on the human environment;
 - (3) a summary of existing credible scientific evidence which is relevant to evaluating the reasonably foreseeable significant adverse impacts on the human environment, and
 - (4) the agency's evaluation of such impacts based upon theoretical approaches or research methods generally accepted in the scientific community. For the purposes of this section, "reasonably foreseeable" includes impacts which have catastrophic consequences, even if their probability of occurrence is low, provided that the analysis of the impacts is supported by credible scientific evidence, is not based on pure conjecture, and is within the rule of reason.

The incomplete or unavailable information provision is recognition of the potential difficulty associated with obtaining essential and credible data necessary to complete the analysis of certain types of impacts in certain situations, especially for those actions that require an EIS.

In situations where specific data is not available or is incomplete, this needs to be communicated to project participants and cooperating agencies as early as possible. This will enhance the opportunity for assistance in data collection and assist in reaching an understanding with participants concerning the availability and acceptability of relevant information.

5. What does NEPA expect of Federal Agencies with respect to indirect and cumulative impacts in the NEPA process?

The NEPA legislation itself does not mention indirect or cumulative impacts. The CEQ regulations address Federal agency responsibility applicable to indirect and cumulative impacts considerations, analysis, and documentation. We find reference to these impacts and requirements

in the definition of the *scope* of a proposal (40 CFR § 1508.25) and in the content requirements for the *environmental consequences* section of an environmental impact statement (EIS) (40 CFR § 1502.16).

The scope of an action (40 CFR §§ 1500.4, 1501.1, 1501.7, and 1508.25) consists of the *range of actions* (connected or closely related, cumulative, and similar actions), *alternatives* (no action, other reasonable alternatives, and mitigation measures), and *impacts* (direct, indirect and cumulative impacts) to be considered in an EIS. For the study to be meaningful the project scope must not be too broadly or too narrowly defined, nor should it be focused on every issue that can be imagined but will likely have little relevance or influence on the project and environmental decisions contemplated in the NEPA study.

The environmental consequences section of an EIS (or EA) forms the scientific and analytical basis for the comparison of alternatives and includes discussion of the adverse impacts that cannot be avoided, including direct and indirect impacts, to support the comparison of alternatives (40 CFR § 1502.16). The CEQ regulations do not specifically mention cumulative impacts in the analysis and comparison of alternatives. Because direct and indirect impacts are caused by and related to project implementation, respectively, they represent the more substantive considerations in the alternatives development and analysis process, beyond the full disclosure and “hard look” provisions of NEPA.

Court cases have focused on the NEPA requirements related to the consideration and analysis of indirect and cumulative impacts. (see also the cases cited in the answer to Question 3).

Where cumulative impacts are concerned, one leading court in Fritiofson v. Alexander, 772 F.2d 1225 (5th Cir. 1985), addressed cumulative impact analysis using the following five-part evaluation:

- 1) What is the geographic area affected by the project?
- 2) What are the resources affected by the project?
- 3) What are the other past, present, and reasonably foreseeable actions that have impacted these resources?
- 4) What were those impacts?
- 5) What is the overall impact on these various resources from the accumulation of the actions?

Other courts have held that an evaluation must occur in the EIS if there are cumulative impacts. Muckleshoot Indian Tribe v. U.S. Forest Service, 177 F.3d 800 (9th Cir. 2001); Save the Yak v. Block, 840 F.2d 714 (9th Cir. 1988).

In City of Carmel v. U.S. Dept. of Transportation, 123 F.3d 1142 (9th Cir. 1997) the court held that an EIS must “catalogue adequately the relevant past projects in the area.” It must also include a “useful analysis of the cumulative impacts of past, present, and future projects.” This means the EIS must analyze the combined effects of the actions in sufficient detail to be “useful to the decision maker in deciding whether, or how, to alter the program to lessen cumulative impacts.”

Indirect and cumulative impact requirements of the CEQ regulations discussed here are generally related to actions requiring the preparation of an environmental impact statement (EIS). Indirect and cumulative impact analysis for projects processed with an environmental assessment (EA) or for categorical exclusion (CE) determinations should be considered commensurate with the

potential for the project to involve these issues. Not all transportation project proposals will necessitate the same degree of indirect or cumulative impact consideration, analysis, or documentation as may be required and appropriate in an EIS. This is further discussed in the answer to *Question 7*.

6. What are FHWA's specific policy and requirements regarding indirect and cumulative impact analysis in the NEPA process?

The FHWA and Federal Transit Administration (FTA) NEPA implementing regulations, Environmental Impact and Related Procedures (23 CFR § 771), do not explicitly address cumulative or indirect impacts, with the exception of the definition for categorical exclusions (23 CFR § 771.117), which addresses potential significant impacts from cumulative CE actions. The adoption of NEPA principles and the process established in the CEQ regulations as the means of project development and environmental decision making is apparent in these procedures. The FHWA regulations supplement the CEQ regulations with a clear reflection of NEPA's environmental policy and action forcing provisions in Section 771.105 Policy, Section 771.109 Applicability and responsibilities, and Section 771.111 Early coordination, public involvement and project development.

An appropriately thorough review of the probable direct and indirect impacts of FHWA actions and documentation of other cumulative effects on specific resources is essential to a reasoned and informed project decision and will assist in attaining FHWA's environmental streamlining and stewardship goals. Failing to adequately consider and document environmental impacts, commensurate with the potential for them to occur, can limit full compliance of essential NEPA requirements and could have serious implications in the ultimate quality of project decisions.

7. Are indirect and cumulative impact consideration, analysis, and documentation requirements the same for categorical exclusions, environmental assessments, and environmental impact statements?

No. Categorical exclusions (CE) and environmental assessments (EA) are intended for Federal agencies to comply with NEPA in those situations where the proposed action does not warrant the preparation of a detailed environmental impact statement (EIS). The consideration, documentation, and analysis requirements vary in degree by class of action and should be commensurate with the potential for adverse and significant impacts, whether direct, indirect, or cumulative.

Environmental impact statements are the detailed documents required by NEPA (Section 102(2)(c)) and are prepared for major Federal actions that significantly impact the human environment (40 CFR §1508.11). Because actions requiring EISs will have significant environmental impacts, the consideration, analysis, and documentation of the **appropriate** issues must be reasonably detailed and disclosed as required by the CEQ regulations.

The level of analysis and documentation required for a specific EIS is primarily dependant on the potential for the action to cause adverse or significant environmental impacts and will vary by resource, project type, geographic location, and other factors. Actions processed with an EIS need to be carefully evaluated during the scoping process to determine the environmental resources, geographic boundaries, time periods, and methodologies to be used in analyzing indirect and cumulative effects.

Categorical exclusions apply to actions that do not have significant environmental effects (40 CFR § 1508.4, 23 CFR § 771.117(a)). A CE is not a document; it is a determination that an action is exempt from the requirement to prepare an EIS. The FHWA/FTA regulation provides two

types of CEs based on the potential for adverse impacts (23 CFR § 771.117(c) and (d)). The level of detail required and documentation necessary for a particular CE depends on the group the action falls under. 23 CFR § 771.117(c) contains a list of 20 categories of actions that, based on FHWA's experience, never or almost never cause significant environmental impacts. These actions are automatically classified as CEs, except where unusual circumstances exist, and do not require the submittal of documentation to FHWA or individual approval. However, other environmental mandates or regulations with separate documentation requirements may apply.

The second list (23 CFR § 771.117(d)) includes 12 examples of actions that have a higher potential for impacts, but still meet the criteria for a CE. These types of actions are also based on FHWA's experience. Due to the higher potential for impacts, these actions require the submittal of appropriate documentation for the FHWA to determine if the CE classification is proper. The level of detail and documentation necessary should be commensurate with the action's potential for adverse environmental impacts. Many State DOTs have developed individual procedures that include acceptable level of detail and documentation requirements for various types of actions and impacts.

Since projects approved with CEs are generally minor in nature and have less than significant impacts, indirect and cumulative impacts assessments will generally not be warranted. There may be exceptions, which can be evaluated on a case-by-case basis.

Environmental assessments are prepared for actions that are not CEs and do not clearly require the preparation of an EIS. One of the primary purposes of an EA is to help the FHWA decide whether or not an EIS is needed and, therefore, should address only those resources or features that have the likelihood to be significantly impacted. The EA should be a concise document that briefly provides sufficient evidence and analysis for determining whether to prepare an environmental impact statement or a finding of no significant impact. It should not contain long descriptions, detailed information, or analyses (40 CFR §1508.9).

The degree to which indirect and cumulative impacts need to be addressed in an EA depends on the potential for the impacts to be significant and will vary by resource, project type, geographic location, and other factors. This issue should be addressed with other agencies and NEPA participants during early coordination activities or scoping.

8. Is documentation of indirect and cumulative impacts really necessary and important?

Yes. Documentation, while perhaps not the single most essential element of the NEPA process, is important. As discussed in these *Questions and Answers*, the bulk of the provisions in the CEQ regulations regarding indirect and cumulative impact responsibilities are focused on adequate documentation in environmental impact statements (EIS).

The FHWA *Technical Advisory, T6640.8a, Guidance for Preparing and Processing Environmental and Section 4(f) Documents*, provides recommendations on the content, format, and processing of environmental impact statement (EIS) and environmental assessment (EA) documents. The *Technical Advisory* does not specifically address cumulative impacts and only discusses indirect impacts with respect to the farmlands, social impacts, coastal barriers, and energy sections of the environmental consequences chapter of an EIS (or EA). Nevertheless, the document needs to present a reasonably complete and accurate picture of the probable consequences involved in implementation of a proposed project, commensurate with the potential for adverse impacts and consistent with the provisions of the CEQ regulations.

The preparation of an environmental document not only addresses the public disclosure requirement, it ensures that the decisionmakers at the Federal, State and local levels will have adequate information to make an informed decision. The environmental document may also provide a basis for other decisionmakers, such as local officials, to understand the related and potential results of one alternative over another and take appropriate action to achieve environmentally desirable outcomes.

The environmental document, EIS or EA, may be the most visible, obvious, and scrutinized element of the NEPA process and it provides evidence of compliance with NEPA and other project development requirements. During NEPA litigation, the environmental document and administrative record will represent the proof of FHWA compliance with the NEPA process requirements, related requirements, and legal standards.

9. What is FHWA's legal authority to mitigate for environmental impacts identified in the NEPA process?

NEPA does not specifically require substantive mitigation for project impacts; direct, indirect, or cumulative. Robertson v. Methow Valley Citizens Council, 490 U.S. 332, 350 (1989). However, the CEQ regulations require that the environmental impacts statement include consideration and discussion of possible mitigation for project impacts (40 CFR §§ 1502.14(f), 1502.16(e-h), 1505.2(c), 1508.25(b)(3)).

Questions 19a. and 19b. of the *CEQ 40 Questions and Answers* provide additional guidance on mitigation to be addressed and documented in the EIS:

“The mitigation measures discussed in an EIS must cover the range of impacts of the proposal. The measures must include such things as design alternatives that would decrease pollution emissions, construction impacts, esthetic intrusion, as well as relocation assistance, possible land use controls that could be enacted, and other possible efforts.”

“All relevant, reasonable mitigation measures that could improve the project are to be identified, even if they are outside the jurisdiction of the lead agency or the cooperating agencies, and thus would not be committed to as part of the RODs of these agencies. This will serve to alert agencies or officials who can implement these extra measures, and will encourage them to do so. ... To ensure that environmental effects of a proposed action are fairly assessed, the probability of the mitigation measures being implemented must also be discussed. Thus the EIS and the Record of Decision should indicate the likelihood that such measures will be adopted or enforced by the responsible agencies.”

Provisions regarding FHWA's legal responsibility and authority for mitigating project impacts are found in FHWA's Environmental regulations Section 771.105(d):

“Measures necessary to mitigate adverse impacts will be incorporated into the action and are eligible for Federal funding when the Administration determines that:

- (1) The impacts for which the mitigation is proposed actually result from the Administration action; and
- (2) The proposed mitigation represents a reasonable public expenditure after considering the impacts of the action and the benefits of the proposed mitigation measures. In making this determination, the Administration will consider, among other factors, the extent to which the proposed measures would assist in complying with a Federal statute, Executive Order, or Administration regulation or policy.”

This provision reflects FHWA’s responsibility to incorporate appropriate mitigation into transportation projects and provide the funding necessary to mitigate the impacts that are actually caused by FHWA funded projects, provided the funding represents a reasonable public expenditure. Other factors to be considered in this determination include the resource impacted, the degree of harm to the resource by the project, the ability of the proposed mitigation to address the impact, whether or not the mitigation is possible, and if it is in the best overall public interest (23 USC 109(h)).

Mitigation for two specific types of highway impacts is addressed in separate FHWA regulations. 23 CFR § 777 addresses FHWA’s authority for replacement of the loss of wetlands, natural habitat area, or functional capacity resulting from a Federal-aid project. 23 CFR § 772 deals with the abatement of highway traffic noise impacts. Neither provision specifically addresses mitigation for indirect or cumulative impacts of transportation projects. Determinations of appropriate mitigation for wetland impacts and highway noise abatement should be considered in the context of FHWA’s mitigation authority, policy and the specific provisions of these subject regulations. __

The FHWA and State DOTs may be called upon in some situations to make difficult decisions regarding commitments of certain mitigation measures that we do not have either the authority or responsibility to consider. It may be necessary in these situations, for FHWA to remind others of the lack of authority to commit Federal funds to the mitigation of impacts not attributable to transportation projects or the actions of others not within our direct control.

The complexity associated with the mitigation of indirect and cumulative impacts is addressed in the FHWA *Position Paper: Secondary and Cumulative Impact Assessment In the Highway Project Development Process*:

“After the analysis is complete a valid question will remain: If a proposed highway improvement is determined to cause potential secondary and cumulative effects, what can and should be done to mitigate the adverse impacts? This is a difficult question for which there are no simple solutions. Consistent with existing FHWA regulations mitigation proposals must be both reasonable and related to project impacts. However, the opportunities for environmental enhancement that are now available under the highway program may greatly expand our traditional view of mitigation. Changing a proposed transportation improvement to lessen its contribution of indirect impacts may likely result from a combination of mitigation and enhancement measures that address area-wide concerns, not just the immediate influence of the project. Unfortunately, measures that would be appropriate to offset most future developmental impacts in the area of a project often will be beyond the control and funding authority of the highway program. In these situations, the best approach would be to work

with local agencies that can influence future growth and promote the benefits of controls that incorporate environmental protection into all planned development.”

In the spirit of environmental stewardship and support of FHWA’s strategic goal to “protect and enhance the natural environment and communities affected by highway transportation”, we should seek opportunities to implement innovative measures that will help our projects fit within the community and natural environment in which they are located. An example of such an opportunity is the integration of context sensitive design and solutions (CSS/CSD) within the NEPA and project development process. The context sensitive solutions approach is a collaborative, interdisciplinary approach that involves all stakeholders in the development of a transportation proposal so the project will fit in with the physical setting and preserve scenic, aesthetic, historic, and natural environmental resources, while maintaining safety and mobility.

It is important that we understand how mitigation is defined in the NEPA process. Replacement or compensation is the last of a sequence of considerations that constitute the overall mitigation expectation of the CEQ regulations (40 CFR § 1508.20). Mitigation includes avoidance and minimization of project impacts first. This hierarchy is often referred to as “sequencing” and means that impact avoidance and minimization measures should be considered early and as an integral component of the alternatives development and analysis process. Replacement or compensation for impacts are intended primarily to deal with residual impacts that cannot be avoided or minimized.

Mitigation that is included, as a commitment in the environmental document becomes an integral and essential part of the transportation project decision. FHWA’s responsibility regarding the implementation of mitigation measures identified as commitments in environmental documents is stipulated in 23 CFR § 771.109(b):

“It shall be the responsibility of the applicant, in cooperation with the Administration, to implement those mitigation measures stated as commitments in the environmental documents prepared pursuant to this regulation. The FHWA will assure that this is accomplished as a part of its program management responsibilities that include reviews of designs, plans, specifications, and estimates (PS&E), and construction inspections.”

10. What specific strategies are most effective in addressing indirect and cumulative impacts and streamlining the project development process?

Accurate environmental impact assessment is highly dependent on the use of appropriate methodology. It is generally recognized among Federal agencies and practitioners that specific methodologies for the assessment of indirect and cumulative impacts, particularly for predicting reasonable foreseeable impacts, are not as well established or universally accepted as those associated with direct impacts, such as traffic noise analysis and wetland delineation. Determining the most appropriate technique for assessing indirect and cumulative impacts of a specific project should include communication with the cooperating agencies and NEPA participants (See 40 CFR § 1503.3). For this reason and others, scoping and interagency coordination are important aspects of the NEPA project development process where cumulative and indirect impacts are a concern. Special attention should be given to these activities to improve our ability to address cumulative and indirect impact expectations and streamline project decisionmaking. Environmental documentation is another area worth mentioning in this discussion. Small improvements in the overall quality of environmental documents can pay major dividends.

Scoping. The CEQ handbook, *Considering Cumulative Effects Under the National Environmental Policy Act (NEPA)* and the NCHRP Report 403, *Guidance for Estimating the Indirect Effects of Proposed Transportation Projects*, and NCHRP Report 466, *Desk Reference for Estimating the Indirect Effects of Proposed Transportation Projects* acknowledge the scoping process as essential to effectively incorporating indirect and cumulative effects into NEPA environmental assessment and analysis.

Scoping is an early and open process for determining the scope of issues, actions, alternatives, and impacts to be addressed in the NEPA study (40 CFR § 1501.7). NEPA studies are intended to be meaningful and focused on decisionmaking, which means the project scope should not be too broadly or too narrowly defined. The scoping process is intended to focus attention on the real issues and de-emphasize consideration of minor issues. This will appropriately narrow the scope of the environmental analysis on the issues that will have an influence on the decision or deserve attention from an environmental stewardship perspective.

The early participation of Federal, State agencies, local agencies, Indian Tribes, and in some cases the general public is essential to the NEPA process and should include attainment of the following outcomes and goals, especially where indirect and cumulative impacts are an issue. The items on the following list were derived from the CEQ cumulative impact guidance, NCHRP Report 403, the CEQ regulations, and the FHWA/FTA regulations. This list is provided as a guide:

- Identification and agreement on the roles and responsibilities of participants and cooperating agencies in the project development process;
- Identification of appropriate project study area;
- Complete inventory of features, resources, ecosystems, and human communities of concern within the project study or influence area;
- Clarification of major and important versus the minor issues associated with the proposed action and alternatives;
- Identification of other actions impacting or potentially affecting the major resources, ecosystems, and human communities;
- Definition of assessment goals, techniques, and methodology for analysis of identified potential effects;
- Establishment of appropriate resource geographic and temporal boundaries related to the identified scope of analysis;
- Identification of planning considerations in the local area, including directions and goals, land uses, and transportation plans for incorporation into the study
- Identification of initial alternatives to the proposal and to avoid and minimize harm to the environment.

The results of early coordination and the scoping process, which includes the definition of project scope (actions, alternatives and impacts), decisions on appropriate assessment methodologies, the extent or depth of analysis necessary, the timing of agency reviews, the project schedule, as well as other agreements and expectations, must be communicated to all involved agencies and the public as early as possible. This information should be included in the environmental document and administrative record. As lead Federal agency, FHWA should take special efforts to ensure, before indirect and cumulative impact studies are

conducted, that cooperating agencies and key review agencies not object to the scope of review, including the specific methodology to be employed.

Key references on scoping and scope in the CEQ Regulations include:

- 1500.4 Reducing paperwork
- 1500.5 Reducing delay
- 1501.7 Scoping
- 1501.8 Time limits
- 1502.7 Page limits
- 1502.16 Environmental consequences
- 1506.5 Agency responsibility
- 1508.25 Scope

Continued coordination. The scoping process and early coordination should not be considered the only opportunity for agencies and the public to engage in the project study. Reasonable communication with cooperating agencies, participants, and the public, as appropriate, should be maintained throughout the project study. The need to revisit certain issues should be considered as additional or new information becomes available. Discussions concerning mitigation should commence as analysis and results allow. Every effort should be made to limit reconsideration or renegotiation of agreements with cooperating agencies and participants reached during scoping, such as the appropriate assessment methodology, temporal and spatial boundaries, and documentation review time frames.

Documentation. While documentation is not the end-all-be-all of the NEPA process, it is important that we do a reasonably good job of communicating the purpose and need of the project; the values used to develop and compare alternatives; the results of analysis for direct, indirect impacts, and cumulative impacts; and mitigation as required by relevant regulation. An environmental impact statement (EIS), or in some cases an environmental assessment (EA), may be the most obvious and scrutinized part of the NEPA process. It provides evidence to the public and participating agencies of our commitment to, and satisfaction of the NEPA requirements. Environmental documentation must communicate clearly the results of project analysis and the subsequent decisions.

We should be mindful of the fact that the adequacy of an EIS document is evidenced by a reasonably thorough discussion of the probable environmental consequences of a proposal. The format and content must provide for informed decisionmaking and fully discuss the analysis and reasoning in choosing a particular course of action over another. There is an established relationship between adequate documentation and the project scope, in terms of detail. The environmental document should focus on the important concerns as opposed to trivial and minor issues. If a topic doesn't add value to the project decision, the related decisions of other agencies, or promote full disclosure, then it should only be briefly discussed or in some cases not included at all.

The following are suggestions for improving and reducing the length of EIS documents taken from the CEQ regulations (40 CFR § 1500.4 Reducing paperwork):

- Set appropriate page limits (1501.7(b)(1) and 1502.7);
- Prepare analytic rather than encyclopedic environmental impact statements (1502.2(a));
- Briefly discuss the minor and less than significant issues (1502.2(b));

- Write in plain language (1502.8);
- Follow a clear format (1502.10);
- Emphasize the portions of the environmental impact statement that are useful to decisionmakers and the public (1502.14 and 1502.15);
- Reduce the emphasis on background material (1502.16);
- Focus on the important environmental issues identified in the scoping process (1501.7);
- Summarize the environmental impact statement (1502.12) and circulate the summary if the environmental impact statement is unusually long (1502.19);
- Incorporate information and data by reference (1502.21);
- Combine environmental documents with other documents (1506.4).

11. Do other Federal environmental requirements include consideration and analysis of indirect and cumulative impacts?

There are several environmental regulations, legislations, and authorities, in addition to NEPA that include indirect and cumulative impact requirements or general policies applicable to specific resource considerations. The following list is for illustration purposes and is not intended to be all-inclusive:

- **The regulations implementing Section 106 of the National Historic Preservation Act (NHPA)** require the consideration of indirect and cumulative impacts when applying the criteria of adverse effect on historic properties (36 CFR §800.5(a)(1)) and delineating the area of potential effects (APE) (36 CFR § 800.16(d)).
- **Section 404 of the Clean Water Act (CWA)** establishes a permitting program to regulate the discharge of dredged and filled material into waters of the United States, including wetlands. The basic requirement is that no discharge of dredged or fill material can be permitted if a practicable alternative exists that is less damaging to the aquatic environment or if the nation's waters would be significantly degraded. Wetland impacts must be avoided where practicable and minimized. Any remaining unavoidable impacts must be compensated for by restoration and creation. The **Section 404 (b)(1) Guidelines for Specification of Disposal Sites for Dredged or Fill Material** (40 CFR § 230 subpart B) requires the CWA Section 404 permitting authority to determine the potential short- or long-term effects by determining the nature and degree of effect the proposed discharge will have, individually and cumulatively (230.11(a)(b)(c)(e)). Cumulative (230.11(g)) and secondary (230.11(h)) effects on the aquatic ecosystem must be considered as part of the Section 404(b)(1) analysis. The US Army Corps of Engineers regulatory responsibilities related to the issuance of Section 404 permits are addressed at **33 CFR § 325, Processing of Department of the Army Permits**.
- **The Federal Emergency Management Agency (FEMA) Regulations on Floodplain Management and Protection of Wetlands** requires the identification of potential direct and indirect adverse impacts associated with the occupancy, modification, and development of floodplains and wetlands. Such identification of impacts shall be to the extent necessary to comply with the requirements of **Executive Order 11988** (May 24, 1977, 42 FR 26951) and **Executive Order 11990** (May 24, 1977, 42 F.R. 26961) to avoid floodplain and wetland locations unless they are the only practicable alternatives and to minimize harm to and within floodplains and wetlands (44 CFR § 9.10).

- **50 CFR Part 402 Interagency Cooperation-Endangered Species Act of 1973, as Amended** requires the evaluation of direct, indirect, and cumulative effects on listed species and designated critical habitat of proposed federal actions (402.12, 402.14). Cumulative effects are defined (402.2) as “those effects of future State or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation”. Note that cumulative effects under ESA do not include past or future Federal actions. Indirect effects are included in the definitions (402.02) of Action, Destruction or adverse modification, Effects of the action, and Jeopardize the continued existence of.
- **The Farmland Protection and Policy Act implementing regulations, 7 CFR Volume 6, Part 658** applies to Federal or Federally assisted projects that may directly or indirectly and irretrievably convert farmland that is defined as: 1) prime, 2) unique, 3) other than prime or unique that is of statewide importance, or 4) other than prime or unique that is of local importance, to nonagricultural use.
- **FHWA Standards, 23 USC 109(l)(1)(b)** requires the evaluation of direct and indirect environmental and economic effects of any loss of productive agricultural land before the right-of-way on any Federal-aid highway can be used to locate a utility facility.
- **The Coastal Barrier Resources Act (CBRA)** designated various undeveloped coastal barrier islands for inclusion in the Coastal Barrier Resources System. Areas so designated were made ineligible for direct or indirect Federal financial assistance that might support development, including flood insurance, except for emergency life-saving activities.
- **Section 3-301(b) of Executive Order 12898 on Environmental Justice** states that whenever practicable and appropriate, Federal agency human health analyses must identify multiple and cumulative exposures to substantial environmental hazards.

12. What indirect and cumulative impacts guidance and training are available?

There are several references related to indirect and cumulative impacts analysis and the NEPA process included in the attachment to these *Questions and Answers*. They include the Federal guidance on cumulative impacts issued by the Counsel on Environmental Quality (CEQ) and the Environmental Protection Agency (EPA), followed by the NCHRP reports for considering indirect impacts in transportation projects. Brief summaries of these documents are provided for information. FHWA’s 1992, Position Paper is included in this list. Another list includes procedures and guidance developed by, or for specific State DOTs for indirect or secondary and cumulative impact analysis in the transportation decision making process. Next is a list of currently available training opportunities and a brief list of select methodologies for your information. Additional information will be provided and maintained at the Re:NEPA Community of Practice website (<http://nepa.fhwa.dot.gov>).

Indirect and Cumulative Impact References

Federal Guidance

- **Considering Cumulative Effects Under the National Environmental Policy Act (NEPA), Council on Environmental Quality, January 1997**

FHWA played a major role in the development of this 1997 guidance, which CEQ describes as a handbook. On October 23, 1997 FHWA distributed it to its field offices. The subject memorandum encouraged FHWA and State DOT’s to use

the handbook as a source of ideas for identifying and evaluating situations where cumulative impacts are important considerations. The handbook is recognized as a tool for practitioners in examining and documenting the effects to social, economic, and environmental resources. It outlines the general principles, presents useful steps, and provides an overview of a number of methods for conducting cumulative effects analysis. While, it is not formal guidance, exhaustive, or definitive, it will assist in developing study-specific approaches to cumulative impacts analysis.

October 23, 1997 Memorandum, is available at the FHWA Environment Guidebook, <http://environment.fhwa.dot.gov/guidebook/index.asp>

- **Consideration Of Cumulative Impacts In EPA Review of NEPA Documents, U.S. Environmental Protection Agency, Office of Federal Activities (2252A); EPA 315-R-99-002, May 1999**

This guidance, while not expressly intended for Federal agencies use in carrying out cumulative impact analysis, includes information pertaining to the EPA's review of cumulative impact analysis in EISs. The guidance is intended to assist EPA reviewers of NEPA documents provide accurate, realistic, and consistent comments on the assessment of cumulative impacts focused on specific issues that are critical in EPA's review of NEPA documents under Section 309 of the Clean Air Act.

This document is available for downloading at the EPA NEPA website. www.epa.gov/Compliance/resources/policies/nepa/index.html

Information on the CAA 309 review process can be found at the following website. www.epa.gov/compliance/about/nepa.html

NCHRP Reports

- **Guidance for Estimating the Indirect Effects of Proposed Transportation Projects. NCHRP Report 403, Transportation Research Board, National Research Council. Prepared by the Louis Berger Group, 1998.**

This document presents the findings of research performed under NCHRP Project 25-10, "Estimating the Indirect Effects of Proposed Transportation Projects". The research was focused on various perspectives of definition, identification, and assessment of indirect effects on proposed transportation projects. The research included a review of environmental policy and NEPA implementation resources of transportation and environmental resource agencies, other related documentation, relevant case law, published literature, and environmental impact statements. Interviews with transportation and resource agency personnel involved in the preparation and review of EISs were also included. The guidance establishes an analysis framework for identification and assessment of indirect effects for transportation projects.

The report can be ordered online at Transportation Research Board (TRB) Bookstore: www.nationalacademies.org/trb/bookstore/

- **Desk Reference for Estimating the Indirect Effects of Proposed Transportation Projects. NCHRP Report 466, Transportation Research Board, National Research Council. Prepared by the Louis Berger Group, 2002.**

This report is based on the results of research carried out under NCHRP Project 25-10(02), "Continuation: Estimating the Indirect Effects of Proposed Transportation Projects." The objectives of this project focused on the update of *NCHRP Report 403, Guidance for Estimating the Indirect Effects of Proposed Transportation Projects* and to provide training materials related to the use of Report 403. The Desk Reference contains a synthesis of regulations, case law, published literature, EIS content, and practitioner experience in indirect effects analysis and documentation. It discusses a framework for identifying and analyzing indirect impacts of transportation projects. Appropriate tools and techniques are also referenced. The Desk Reference is supported by a course curriculum that provides instruction on applying the techniques of Report 403.

The Desk Reference is available (in PDF format) at the following website:
gulliver.trb.org/publications/nchrp/nchrp_rpt_466.pdf

The Desk Reference can be ordered online at Transportation Research Board (TRB) Bookstore: <http://gulliver.trb.org/bookstore/>

FHWA Guidance

- Position Paper: Secondary and Cumulative Impact Assessment In the Highway Project Development Process. FHWA, 1992

The position paper represents the first and only formal guidance issued by FHWA until the release of this interim guidance. It provides a basic orientation to the subject and suggests a decision making framework of 8 general concepts for incorporating secondary and cumulative impact considerations into the highway project development process.

Available at the FHWA Environmental Guidebook website
www.fhwa.dot.gov/environment/guidebook/index.htm or

- **NCHRP Report 466 Desk Reference for Estimation the Indirect Effects of Proposed Transportation Projects and supporting slide presentation.**

The Desk Reference mentioned above in guidance is supported by a curriculum for providing instruction on the techniques of Report 403. The report and supporting slide presentation should be of interest to FHWA, State DOTs and others, as a resource for transportation planners and engineers, environmental practitioners responsible for project development and environmental impact analysis. The course curriculum is free and available on the Internet. The Louis Berger Group authored the NCHRP reports and delivered this training.

Contact: Larry Pesesky, lpesesky@louisberger.com at 973-678-1960 ext. 487

•**Workshop on Methods for Evaluating Secondary and Cumulative Land Use Impacts.**

The FHWA and the New England Region of the Environmental Protection Agency are co-sponsoring one-day workshops that will present successful methods used to evaluate secondary and cumulative land use impacts of transportation projects. Included in the workshop will be a review of the available methods, guidelines for selection of methods, and a case study on expert panels. The initial offerings will be held February 25, 26, and 27, 2003 in Albany, NY, Hartford, CT, and Boston, MA, respectively. Future course offerings will be considered

Contact: Katherine Still, still@pbworld.com,

Select Related References

- U.S. EPA, 2000. Projecting Land-Use Change: A Summary of Models for Assessing the Effects of Community Growth and Change on Land-Use Patterns. EPA/600/R-00/098. U.S. Environmental Protection Agency, Office of Research and Development, Cincinnati, OH. 260 pp.
- U. S. EPA, 2000. Our Built and Natural Environments: A Technical Review of the Interactions between Land Use, Transportation, and Environmental Quality. EPA/231/R-01/002. U.S. Environmental Protection Agency, Development, Community, and Environment, Washington, DC 20460

<http://www.smartgrowth.org/library/built.html>

- The Use of Expert Panels in Analyzing Transportation and Land Use Alternatives. Transportation Research Board, National Research Council. Prepared by Parsons Brinckerhoff Quade and Douglas, Inc. for FHWA National Cooperative Highway Research Program. (Report Pending)
- Land Use Impacts of Transportation: A Guidebook. NCHRP Report 423A Transportation Research Board, National Research Council. Prepared by Parsons Brinckerhoff Quade and Douglas, Inc., and Daniel K. Boyle of Transportation Management and Design. Prepared for FHWA National Cooperative Highway Research Program, 1999, 165pp.

Website: <http://www.nas.edu/trb>

- Guidebook for Assessing the Social and Economic Effects of Transportation Projects, NCHRP Report 456. Transportation Research Board, National Research Council. Prepared by David J. Forkenbrock, Public Policy Center, University of Iowa, Iowa City, IA and Glen E. Weisbrod, Economic Development Research Group, Boston, MA. Prepared for FHWA National Cooperative Highway Research Program, 2001, 242pp.
- Toolbox for Regional Policy Analysis Website, Developed for the Federal Highway Administration, and Federal Transit Administration by Cambridge Systematics, Inc.

<http://www.fhwa.dot.gov/planning/toolbox/index.htm>

- FHWA Context Sensitive Solutions Website
<http://www.fhwa.dot.gov/csd/102902.htm>
- FHWA Flexibility in Highway Design Web Document
<http://www.fhwa.dot.gov/environment/flex/index.htm>